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Electric Railway Journal

Volume 69

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Getting the Most from the Index

This is essentially a subject index, not an index of titles, and articles treating a number of different subjects are listed under each of them. In addition, a geographical reference is published wherever the article relates to any particular railway company, city, state or nation. Entries about an electric railway are under the name of the city in which the main office of the company is located, but in the case of electrified sections of steam railroads, the entries appear under the name of the railroad.

In the subject index, the alphabetical method is followed. If there is a choice of two or three keywords the one most generally used has been selected, cross references being supplied. Below is a list of the common keywords used in the index to this volume. This list has been subdivided for convenience into fourteen general subjects.

The headings which appear in the index itself are in small type under the general classifications. The main headings in capitals below do not appear in the index. The list of keywords is revised from time to time to keep the index abreast with developments.

As an example of how to use the index, if a reader wishes to locate an article on special trackwork he obviously would look in the list below at the general subject "Track." Under this caption, only "Special trackwork" could apply to the article in question. The reader would therefore refer to this keyword under S in the body of the index.

In addition to the groups of articles covered by these headings, papers and reports from railway associations are grouped under the names of the various organizations. Proceedings of other associations and societies are indexed in general only in accordance with the subject discussed. Short articles about machine tools appear only under the heading "Repair shop practice; shop methods and equipment" and are not indexed alphabetically, because there is a wide choice in most cases of the proper keyword to be used.

Signed articles also are indexed by the name of the author. When the name of the author is known to the reader this provides the simplest method of locating any article.

CLASSIFIED LIST OF KEYWORDS

ACCIDENTS AND ACCIDENT PREVENTION

Accident claim department
Accident prevention
Accidents (including wrecks)
Insurance, Fire
Safety work
Storm and fire damage

ELECTRIC CARS AND SERVICE CARS

Cars (including car design)
Locomotives
Service and tower trucks
Trackless trolley

CAR EQUIPMENT

Bearings
Brakes and compressors
Doors, car
Electrical equipment for cars (except motors)
Gears and pinions
Heaters, electric
Lighting and lighting fixtures
Motors, Electric
Resistors
Seats
Trolley wheels
Trucks
Wheels and axles

EMPLOYEES

Education
Employees
Insurance and pensions
Labor
Strikes and arbitrations
Wage decreases
Wage increases
Wages and working agreements

FARES

Fare collection (including apparatus)
Fare decreases
Fare Increases
Fares
Traffic investigations
Traffic stimulation

FINANCIAL, LEGAL AND STATISTICS

Accounting
Appraisal of railway property
Blanks and forms
Discontinuance of lines
Financial (methods of financing)
Financial reports
Franchises
Insurance, Fire
Insurance and pensions
Legal
Legislation for railways
Market conditions
Operating records and costs
Public service and regulative commissions
Statistics
Taxes

HEAVY ELECTRIC TRACTION

Heavy electric traction (general)
Locomotives

MAINTENANCE OF EQUIPMENT

Car cleaning
Lubrication
Maintenance practice
Motor buses, Practice with
Painting
Repair shop practice; cars and car equipment
Repair shop practice; shop methods and equipment
Repair shops and equipment
Stores
Tests of materials and equipment
Welding

MOTOR BUSES

Motor buses, design
Motor buses, gas-electric
Motor buses, field for
Motor buses, installations
Motor buses, jitney competition
Motor buses, operating practice
Motor buses, regulation

POWER

Energy checking devices
Energy consumption
Fuels
Overhead contact system

POWER—Continued

Power distribution
Power generation
Power stations and equipment
Power transmission
Substations and equipment

STRUCTURES

Bridges
Carhouses and storage yards
Power stations and equipment
Repair shops and equipment
Substations and equipment
Terminals and waiting stations

TRACK

Pavements
Rail joints and bonds
Rails
Special trackwork
Ties
Track construction
Track maintenance

TRAFFIC AND TRANSPORTATION

Advertising
Customer ownership
Dispatching
Freight and express
Interurban railways
Merchandising transportation
Parking of cars
Publicity
Public, Relations with
Rapid transit (elevated and subway)
Schedules and timetables
Signals
Street traffic congestion
Traffic investigations
Traffic regulation
Traffic stimulation
Transportation, Metropolitan (general studies)

MISCELLANEOUS

European practice
Management
Noise reduction
Railways (general)
Snow and ice removal
Standardization
Wood preservation

INDEX TO VOLUME 69

PAGES BY WEEKS

January 1	1 to 66
January 8	67 to 104
January 15	105 to 150
January 22	151 to 190
January 29	191 to 230
February 5	231 to 272
February 12	273 to 316
February 19	317 to 364
February 26	365 to 404
March 5	405 to 442
March 12	443 to 478
March 19	479 to 558
March 26	559 to 598
April 2	599 to 638
April 9	639 to 678
April 16	679 to 724
April 23	725 to 762
April 30	763 to 802
May 7	803 to 848
May 14	849 to 890
May 21	891 to 936
May 28	937 to 984
June 4	985 to 1024
June 11	1025 to 1070
June 18	1071 to 1124
June 25	1125 to 1166

A

Accident claim department:
—Progress in adjusting claims, Comments on, 1073.
—Public relations affected by, Comments on, 600.

Accident prevention:
—Accident prevention bonus aids [Hodges], 215.
—Accident prevention work, Third Ave. Ry. [Segard], 216.
—Atlanta, Ga., Campaign, 550, 926, 1112.
—Boston, Mass., No-accident Week, 750.
—Chicago, Ill., Prizes awarded for, 667.
—Detroit, Mich., Campaign results, 1004.
—Discussed by Canadian Electric Ry. Assn., 1050.
—Keighley, England, 221.
—Memphis, Tenn., Stripes on drop platforms prevent accidents, *744.
—Metropolitan Section, A.E.R.A., discuss, 664; Comments on, 641.
—Milwaukee, Wis., Crossing accidents reduced, 1046.
—Nashville, Tenn., Campaign, Results, 862.
—New Orleans, La., 4 years, 586.
—One-man car operation reduces accidents [Palmblade], 580; Comments on, 600.
—Personnel cooperation necessary, Comments on, 561.
—Philadelphia, Pa., Campaign, *626.
—Poughkeepsie, N. Y., "No accident" contest, 922.
—Trenton, N. J., No accident bonus plan, 354.
—Work of Claims and Transportation and Traffic Associations, Comments on, 232.

Accidents (Including wrecks):
—Causes analyzed, Chicago, Ill., *70.
—Hazards of street work [Matthews], c957, Comments on, 987.
—Kansas City, Mo., Bus accident, 143.
—New Haven, Conn., Lineman injured, 466.
—Poor tools cause, 502.
—Superior, Wis., Railroad crossing wreck, 140, 220, 354.

Accounting:
—Bus depreciation, Mileage the basis for [Blair], 1104.
—Detroit, Mich., Bus and railway accounting data sought, 184; Comments on, 192.
—I.C.C. depreciation case, 264, 351, 883; Comments on, 892.
—Timekeeping simplified, Minneapolis, Minn., *241.
—Ton-mile freight cost, Determination of [Cole], 813.

Advertising:
—Atlanta, Ga., Campaign, Details, *1032.
—Australia, Railway station advertising, 613.

Advertising (Continued):
—Discussed by Southwestern Public Service Assn., 827; Comments on, 803.
—Foshay Company advertising contest, 667, 880.
—Fort Worth, Tex., Radio as advertising medium, 242.
—Highwood, Ill., Illuminated signboard, 586.
—Houston, Tex., Newspaper advertising, 626.
—Posters on poles, Comments on, 1027.
—Public Utilities Advertising Assn. annual meeting, Program, 1009.
—Saginaw, Mich., Advertising increases patronage, *239.
—W. B. & A. service advertising, *432.
—Westinghouse advertising policy, 478.

Africa:
—Bus competition with South African trams, 94.

Airplanes:
—Charles Lindbergh's feat, Comments on, 937.
—Haskelite wood used in, 1068.

Akron, Ohio:
—Northern Ohio Power & Light Co.:
    Annual report, 1117.
    Bus school, Work of, *1002.
    Car cleaning and painting, Details [See], *1041.
    Franchise negotiations in Canton, 307.
    One-man cars in Barberton, 626.
    Operating rearrangement proposed, 392.
    Rerouting changes, Bus, 586.

Albany, N. Y.:
—Eastern New York Utilities Corporation:
    Buses to be substituted in Hudson, 308.
—United Traction Co.:
    Annual report, 1118.
    Bus operating details, *279.
    Bus order placed, 228.
    Fare controversy, 141, 468, 881, 1153.
    Fare increase ordered, 1110.

Allentown, Pa.:
—Lehigh Valley Transit Co.:
    Annual report, 883.
    Schedule cards increase bus receipts, 628.

Alliance, Ohio:
—Stark Electric Co.:
    Annual report, 592.
    Negotiations for Canton railway, 436.

Altoona, Pa.:
—Altoona & Logan Valley Electric Ry.:
    Improvements in 1926, 103.

American Electric Railway Accountants' Association:
—Committee activities:
    Depreciation, 710.
    Stores accounting, 137.

American Electric Railway Association:
—Advisory Council:
    Modernization work [Storrs], *449; Comments on, 445.
—Annual convention:
    Bus tool exhibits, Comments on, 601.
    Conference leaders to be trained, Comments on, 1072.
    Exhibit committee appointments, 463.
    Exhibits to open on Saturday, Comments on, 639.
    Exhibits, Worth of, Comments on, 985.
    Noisy exhibits banned, 982.
    Space applications for exhibits, 676, 800, *1070; Comments on, 763.
    Track space applications, 440, 666.
—Bureau of Information:
    Reports available, 258, 710, 970, 1150.
—Committee activities:
    Convention entertainment, 1107.
    Cooperation with manufacturers, 970.
    Cooperation with state and sectional associations, 302.
    Education, 351, 1108; Comments on, 366.
    Executive, 301, 662, 1056; Comments on, 639.
    Exhibit, *582, 662; Comments on, 639.
    Fire prevention, 747.
    Insurance, 216; Comments on, 153, 560.
    Noise reduction, 785.
    Rapid transit, 427.
    Subjects and meetings, 546.
    Unification of car design, 176, 623.
—Metropolitan Section:
    Accident prevention discussed, 664; Comments on, 641.
    Popularizing service discussed, 136.
    Public relations discussed, 302.
    Transportation developments discussed, 463.
—Need for and purpose of [Sawyer], 276.
—New members elected, 302, 1057.
—Public Service Section:
    Officers elected, 427.
—Traffic, Fare and wage figures, 265, 670, 1062.

American Electric Railway Claims Association:
—Accident prevention work, Comments on, 232.
—Committee activities:
    Executive, 258.

American Electric Railway Engineering Association:
—Committee activities:
    Executive, 257.
    Heavy electric traction, 258, 785.
    Purchases and stores, *463, 920; Comments on, 893.

American Electric Railway Engineering Association:
—Committee activities (Continued):
    Overhead current collecting devices, 920.
    Power generation and conversion, 747.
    Power transmission and distribution, 622, 1150.
    Rolling stock, Details, 115, 427, 663, 1107, 1108.
    Standardization, 90.
    Standardization of trolley wire, 709.
    Way and structures, 137, 583, 710, 746, 970, 1108.
—Engineering manual out, 970.
—Research department plan proposed [Williams], c575; [Rossell], c742.
—Standard journal bearings, *527.

American Electric Railway Transportation & Traffic Association:
—Accident prevention work, Comments on, 232.
—Annual convention:
    Program, 920.
—Committee activities:
    Bus operation, 351, 747, 970.
    Executive, 350.
    Service betterment, 583, 1010.
    Traffic congestion, 1108.
    Traffic and safety, 137, 709.

American Engineering Council:
—Annual meeting, Report, 257.
—Traffic control surveys to be made, 198.

American Institute of Electrical Engineers:
—Officers elected, 969.

American Society of Mechanical Engineers:
—Arc welding prizes to be awarded, 462.

Anderson, Ind.:
—Union Traction Co.:
    Collect-on-delivery freight service, 1110.

Appraisal of railway property:
—Baltimore, Md., Valuation case, 1117.
—Boston Elevated Ry., Valuation ordered, 879.
—Buffalo, N. Y., Commission valuation, 397.
—Louisville, Ky., Valuation figures, 1154.
—Oakland, Cal., Valuation figures, 353, 921.
—Washington, D. C., Valuation controversy, 310 398.

Atlanta, Ga.:
—Cody Safety Medal created, 1060.
—Georgia Railway & Power Co.:
    Accident prevention work, 550, 926, 1112.
    Car appearance affects receipts [McAloney], c459.
    Consolidation of properties approved, 223.
    Electric hoist mad efrom air compressor, *1094.
    Fare increase sought, 1059.
    Hydraulic bearing press, *912.
    Jurisdiction of officers widened, 226.
    Lost article disposition, 668.
    New directors named, 932.
    Picnic coach service, 839.
    Publicity campaign, Details, *1032.
    Storage plant to be constructed, 228.
    Wage contract renewed, 220.
    Wheel and axle maintenance, Details [Axell], 255.
    Wood preservation, Methods and equipment, Details [Smith], *455; Comments on, 444.

Atlantic City, N. J.:
—Atlantic City & Shore R.R.:
    Babbitting bearings, 659.
    Cars rebuilt, Details, *733.
    Track building and maintenance [Ashbridge], *1074.
    Triple baking prolongs armature life, 1047.

Atlantic & Suburban Ry. (see Pleasantville, N. J.)

Auburn, N. Y.:
—Auburn & Syracuse R.R.:
    Abandonment sought, 754.
    Receivership likely, 471.

Aurora, Ill.:
—Chicago, Aurora & Elgin R.R.:
    De luxe cars ordered, Details, 270.
    Freight service improved, 1110.
    Suburban home seekers booklet, 973.
    Terminal, Construction plans, 477.
—Aurora, Elgin & Fox River Electric Co.:
    Schedule changes, 585.

Australia:
—Advertising at stations, 613.
—Bus operation, Results, Details, 858.

Austria:
—Vienna traffic during 21 years, Review, *411.

Automobiles:
—Saturation problem, 926; Comments on, 1127.
—Use by industrial workers, Comments on, 986.
—Workmen's, Comments on, 937.

B

Baltimore, Md.:
—United Railways & Electric Co.:
    Accomplishments in 1926, 468.
    Annual report, 930.
    Bus subsidiaries consolidate, 58.
    Car equipment ordered, 1023.
    Car painting, Old and new methods [Clark], *498.
    Gasoline tax rebate, 665.
    Notes offered to investors, 399.
    Refinancing plans, 929.
  Valuation case, 1117.

READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX
Abbreviations: *Illustrated. c Communications.

Baltimore, Md. (Continued):
—Washington, Baltimore & Annapolis Electric R.R.:
Annual report, 1157.
Articulated cars, Details, *165, *550, *570; Comments on, 559, 599.
Bearing flanges reclaimed, *519.
Bus service planned, 308.
Control changes hands, 1015.
De luxe cars ordered, 363.
Operating agreement suit, Decision, 1154.
Sale approved by Commission, 1062.
Scaffold plank storage, *341.
Service advertising, *432.
Bangor, Me.:
—Bangor Hydro-Electric Co.:
Rail joints welded with small plates, *133.
Batavia, N. Y.:
—Batavia Traction Co.:
Bus substitution planned, 791.
Bearings:
—Axle:
Fange fitted to truck, *343.
Housing type, Third Ave Ry. *894; Comments on, 1071.
—Bearings made of lead brass, San Francisco, Cal., *1077.
—Center bearings, Lubrication [Williams], *1092.
—Housing type, For axles, Third Ave Ry., *894.
—Maintenance, Improved methods [Williams], *347.
—Smooth surfaces aid tight bearings [Dean], *782.
—Standard dimensions of journal bearings, *527.
Beaumont, Tex.:
—Instructions to new men [Brann], 834.
Beaver Valley Traction Co. (see New Brighton, Pa.):
Berkshire Street Ry. (see Pittsfield, Mass.):
Berlin, Germany (see Germany):
Binghamton, N. Y.:
—Binghamton Ry.:
Fare increase hearing, 751.
Birmingham, Ala.:
—Birmingham Electric Co.:
Alemite lubrication for brake hangers [Taurman], *914.
Machine holds rails for welding [Taurman], *1094.
New cars, Design, Details, *77.
—Traffic survey, 973, 1153.
Blanks & forms:
—Automobile and truck repair blanks [Reed], *515.
—Car inspection forms, *1105.
—Chart for paint shop record, *781.
—Conductors trip sheet, Los Angeles, Cal., *76.
—Daily time sheet, Minneapolis, Minn., *241.
—Electrical department forms, [Smith], *682.
—Forms printed on used register cards, New Bedford, Mass., 383.
—Inspection forms, Chicago, Ill. [Smith], *511.
—Inspection tag, Harrisburg, Pa., *329.
—Line inspection form, *896.
—Schedule making and checking forms, *997.
—Simplified invoice drafted by U. S. Commerce committee, *760.
—Trainmen's efficiency record, Los Angeles, Cal., *1139.
Book reviews:
—Accounting procedures for public utilities, by Warren G. Bailey, M. A. and D. E. Knowles, 312.
—American railway accounting, by Elizabeth Cullen, 98.
—A small stockholder, by John T. Roderick, 1064.
—Benjamin Garver Lamme, an autobiography, 885.
—Corporate resolutions, by Isabel Drummond, 1065.
—Doing export business, by Foreign Commerce Dept. of Chamber of Commerce, 1064.
—Electric power stations, by L. W. W. Morrow, 474.
—Employment statistics for the United States, by Ralph C. Hurlin and William A. Berridge, 673.
—Facts and figures of the automobile industry, 1927 edition, by National Automobile Chamber of Commerce, 1065.
—Forecasting business conditions, by Charles O. Hardy and Garfield V. Cox, 1065.
—Mainsprings of men, by Whiting Williams, 98.
—Main Street and Wall Street, by William Z. Ripley, 474.
—Making transportation pay, edited by Henry H. Norris, 884.
—Manual of endurance of metals under repeated stress, by H. F. Moore, 1064.
—Mathematical principles of finance—Second edition, by Frederick C. Kent, 884.
—Metropolitan street traffic survey (Chicago), by Miller McClintock, 98.
—Notes on the collection of transfers, by Frank Folupa, 312.
—Personenbahnhöfe (Passenger railway stations), by W. Cauer, 98.
—Political and industrial democracy, by W. Jett Lauck, 98.
—Primer of simplified practices, by U. S. Dept. of Commerce, 474; Comments on, 443.
—Profit sharing and stock ownership for employees ,by Gorton James, H. S. Dennison, E. F. Gay, H. P. Kendall and A. W. Burritt, 673.
—Psychology of selecting men—New second edition, by Donald A. Laird, 1064.
—Standards year book, 1927, by U. S. Dept. of Commerce, 1065.
—Street railway transportation in Cincinnati, by Rebecca Van Hamm, 673.
—Switching equipment for power control, by Stephen Q. Hayes, 673.
—The electrician annual tables of electricity undertakings, 1927, by Benn Brothers, Ltd., 1065.
Book Reviews (Continued):
—The evolution of overhead accounting, by Chamber of Commerce of the United States, 1064.
—The rapid transit situation in Greater New York, 312.
—The tired trolley car, by Beth A. Retner, 98.
—Tips on leadership—Life stories of 25 leaders, by Herbert N. Casson, 1065.
—What a business executive should know about patents, by Roger Sherman Hoar, 673.
—What price progress? by Hugh Farrell, 884.
Boone, Iowa:
—Ft. Dodge, Des Moines & Southern R.R.:
Bus company purchase, 469.
Boston & Maine R.R.:
—Boston electrification not favored, 56.
Boston, Mass.:
—Boston Elevated Ry.:
Annual report, 264; Comments on, 1127.
Chart shows increase from 1897, 719.
Dynanometers regulate trolley wire tension, 488.
Educational Work, 1154.
Financial readjustment suggested, 144; Comments on, 727.
Legislative action in 1927, 625, 750; Comments on, 764.
New guide book issued, *165.
No-accident week successful, 750.
Public control extension discussed, 261, 590.
Reorganization plans, 185, 223, 357.
Snow-fighting methods, Details [Steward], *567.
Timber preservation, Details, *320; Comments on, 317.
Valuation ordered by legislature, 879.
—Eastern Massachusetts Street Ry.:
Annual report, 719.
Base plate rail joint developed, details [Walker], *773, 902.
Board members elected, 592.
Car and equipment improvements, Details [Bolt], *207.
De luxe cars ordered, 228; Details, *1069.
Part fare received from bus competitor, 395.
Public control arrangement termination, 224.
Sources of radio interference [Bickford], 968.
Wages increased, 786.
—Operating agreement between two railways, 307; Comments on, 681.
—Switch and signal contract let, 557.
—Traffic survey to be made, 467.
Boston & Worcester Street Ry. (see Framingham, Mass.):
Brady safety award offered, 664; Comments on, 640.
Brakes and compressors:
—Air brakes, Installation and maintenance [Horner], 389.
—Air-magnetic brake, Lexington, Ky., 990.
—Air-magnetic brakes discussed by C.E.R.M. M.A., 346; Comments on, 317.
—Berlin, Germany, Axle brakes, *174.
—Berlin, Germany, Braking equipment [Pforr], *203.
—Joliet, Ill., Automative type brakes, Details, *602.
—Springfield, Mass., experimental worm-drive car, *859.
Brazil:
—Swiss-Argentine Railway organized, 94.
Bridges:
—Canadian bridge improvements, 1165.
—Cleveland, Ohio, Moving bridge used in station construction, Details, *247.
—St. Louis, Troy & Eastern R.R., Contract let, 228.
Brooklyn City R.R. (see New York City):
Brooklyn - Manhattan Transit Co. (see New York City):
Buffalo & Erie Ry. (see Erie, Pa.):
Buffalo, N. Y.:
—Bus franchise controversy, 183, 263, 629, 881.
—International Ry.:
Annual report, 398.
Art poster contest for students, 586.
Board of directors, Changes in, 635.
Buffalo-Canada bus service, *1155.
Bus controversy with city, 1061.
Bus routes popular, 975.
Canadian bridge improvements, 1165.
Cars repainted, 908.
Commission valuation protested, 397.
Employee charity contributions, 926.
Fare controversy, 93, 138, 220, 428, 712, 973, 1109. Comments on, 986.
Franchise controversy, 924.
New transfer system, 1011.
Sick benefits paid in 1926, 1046.
—Ordinance against one-man cars overruled, 625.
—Transportation situation discussed, 304.

C

California, State of:
—Bus operations, Railroad Commission report [McCabe], *866.
Canada:
—Railway operations, Survey, Details, *852; Comments on, 849.
—Annual meeting, Report, 1050; Comments on, 1072.
Canton, Ohio:
Canadian Electric Railway Association:
—Northern Ohio Power Co.:
Alliance railway negotiates for control, 436.
Capital Traction Co. (see Washington, D. C.):
Car cleaning:
—Akron, Ohio, Methods [Seel], *1041.
Car cleaning (Continued):
—Cleanliness important [Potter], c289.
—Cold steam process [Albert], c908.
—Disinfectant for cars, San Francisco, 661.
—Effect on public [Clark], 116.
—Harrisburg, Pa., Washing cars, Methods [Rexroth], *341.
Snow fighting equipment, Design [Steward], *567.
—British car designed for quiet operation, Details, *817.
—Car equipment apparatus improvements [Axtell], 254.
—New Haven, Conn., Pressure shower bath method, *990.
—Pittsburgh, Pa., Automatic washing, Details, *451.
—Philadelphia, Pa., Methods [Stier], c339.
—Third Ave. Ry. methods, Details [McWhirter], *482.
Carhouses and storage yards:
—Atlanta, Ga., Storage plant to be built, 228.
—Cincinnati, Hamilton & Dayton Ry. purchases carhouse, 402.
—San Francisco, Cal., Facilities [O'Shaughnessy], *408.
—Waterbury, Conn., Details, *446.
—Williamsport, Pa., New carhouse, Details, *728.
—Carpenter shop waste disposal plant, Richmond, Va., *1144.
Cars (Including design):
—Akron, Ohio, Remodeled cars [See], *1041.
—Aluminum body for Joliet, Ill. worm-drive truck, 1068.
—Atlantic City, N. J., Rebuilt cars, *733.
—Attractive and speedy cars needed [Myers], c289.
—Aurora, Ill., De luxe cars ordered, 270.
—Berlin, Germany, Car development, Details [Pforr], *203, *243.
—Birmingham, Ala., New cars installed, Details, *77.
—Boston, Mass.:
Cars modernized, Methods [Bolt], *207.
De luxe cars ordered, 228; Details, *1068.
—Cars ordered, Specifications:
Berlin, Germany, *174.
Birmingham, Ala., *77.
Chicago Surface Lines, *271.
Dallas, Texas, *189.
Fitchburg, Mass., 441, 724.
Gary, Ind., *210.
Greenfield & Montague Transportation Area, *1163.
Hamilton, Ont., Can., 104.
Interstate Public Service Co., 934.
Jamestown, N. Y., *994.
Milwaukee, Wis., *327.
Mobile, Ala., *1123.
New Brighton, Pa., 1164.
Pittsfield, Mass., *722.
Porto Rico Ry., Light & Power Co., *761.
Scranton, Pa., *229.
Springfield and Worcester, Mass., *595.
Virginia Electric & Power Co., *801.
W. B. & A. articulated cars, *570.
Wheeling, W. Va., *441.
Williamsport, Pa., *103.
—Charlotte, S. C., Shop-built car, 442.
—Cincinnati, Ohio, Interiors remodeled, Details, *609.
—Clean cars impress patrons [Clark], 116.
—Cleveland, Ohio, Aluminum car construction, *655; Comments on, 639.
—Combined snow scraper and sweeper, *380.
—Coupler, Universal Joint, for articulated cars, *462.
—De luxe car evolution, Comments on, 601.
—De luxe cars discussed by Birney Club, 301.
—De luxe double-deck car designed by Peter Witt, Details, *370.
—De luxe parlor and dining cars, South Bend, Ind., 417; Comments on, 406.
—Demand for modern cars must be created [Lambert], 299.
—Design, Perfections of detail, Comments on, 680.
—Development of electric car, 968.
—"Dressing up" street cars [Holtzclaw], 833.
—East St. Louis, Ill., Rebuilt cars, Design, *1000.
—Electro-gas cars, Rock Island R.R., *935.
—Essentials of, discussed in booklet, 1068.
—Evansville, Ind. cars named after first settlers, 866.
—Fort Worth, Texas, Limited train overhauled, Details [Hoskins], *246.
—Freight car, Standard design, Comments on, 67.
—Freight, Condition and repair, C.E.R.M.M.A. rules, *961.
—Gas-electric:
C. M. & St. P. order, 846.
D. T. & I. install, *847.
Lehigh Valley R.R., *102.
Northern Pacific, 984.
—German rapid transit cars [Cauer], *1131.
—Improvements of equipment, Comments on, 275.
—Interurban cars, Cincinnati, Ohio, Design, 315.
—Jamestown, N. Y., De luxe cars, Details, *994.
—Light metal for car construction in Europe, 819.
—Linoleum and rubber mats on floors, Wilkes-Barre, Pa., *385.
—Memphis, Tenn., Reconstructed cars, *454.
—Milwaukee, Wis., New cars installed, Design, Details, *327.
—Minneapolis, Minn., Noiseless cars, 103, 477.
—Modern cars and proper maintenance economical, Poem, 514.
—Modern cars increase riding [Chiles], c249; [Bucher], c249; [Hearn], c249.
—Modern equipment demands speed and comfort [Palmer], 300.
—Modernization, Progress of [Oswald], 621.

Cars (including design) (Continued):
—Modern rolling stock attracts patrons [Potter], c423.
—Motorman's stool chained to platform, *1084.
—Milwaukee, Wis., Car construction program, 800.
—Newark, N. J., Semi-de luxe car, Design, *170.
—New Bedford, Mass., Car rebuilt like motor coach, *1138.
—Obsolete equipment replacement, Comments on, 1025.
—Old cars should be replaced [Colby], c289.
—One-man:
  Advantages of [Palmblade], 580; Comments on, 600.
  Barberton, Ohio, 626.
  Buffalo, N. Y., Ordinance against overruled, 625.
  Des Moines, Ia., Court decision on, 548, 585; Appeal, 1058.
  Fare collection methods [Weyman], 1053.
  Growth of operations, Comments on, 1026.
  Hampton, Va., Rebuilt cars, 188.
  Iowa Supreme Court decision on, 585.
  Opposition to, Comments on, 318.
  Pennsylvania, Bill killed against, 712.
  Tennessee, Bill against operation lost, 789.
  Toronto, Can., Operation sustained, 352; Comments on, 318.
  Use in the South, Details [Frehse], 254.
—Orders in 1926, Statistics, *20; Comments on, 4, 67.
—Parlor cars, Rochester & Syracuse R.R., Design, *1044.
—Passenger cars rebuilt for freight trailers, *162.
—Portsmouth, Ohio, Design and operation, *1133.
—Providence, R. I., Remodeled cars, Details [Dickson], *988.
—Refuse car, Screened, York, Pa., *329.
—Remodeling methods, Kansas City, Mo. [Neal], *689.
—Remodeling old cars for comfort [McRae], 115; Comments on, 231.
—Rockford, Ill., Interurban cars ordered, 270, 363.
—Rome, Italy, Design, Details [Blake], *945.
—San Diego, Cal., Multiple-unit train couplers, Details [Averill], *167.
—Snow plow car, Design, [Wheeler], *286.
—South Bend, Ind., New cars, 228.
—Springfield, Mass., Expriemental car, Design, Details, *562, 713, *859; Comments on, 559, 599, 725.
—Steel, Conference called in New York City, 557.
—Sun visor on front window, *116.
—Tail lights locked in place, *251.
—W. B. & A. articulated cars, Details, *165, 363, *550; *570; Comments on, 559, 599.
—West Penn Ry. de luxe car, Details, *1036.
—Williamsport, Pa., Design, Details, *728.
—Work car equipment, Salt Lake City, Utah [Heiges], *697.

Central Electric Railway Association:
—Annual meeting, Program, 53.
—Annual meeting, Report, 295.
—Charles L. Henry Memorial, 923.

Central Electric Railway Master Mechanics' Association:
—Annual meeting, Report, 346; Comments on, 317.
—Committee appointments, 462.
—Rules for freight cars, Condition and repairs, *961.
—Summer meeting:
  Program discussed, 748.
—Two-day session, Report, *918; Comments on, 891.
—Working for progress [Green], c957.

Centralia, Ill.:
—Fare increases sought by traction companies, 178.

Chamber of Commerce of the United States:
—Annual meeting, Plans for, 760, 785.
—Annual meeting, Report, 872; Comments on, 850.
—Corporation income tax reduction urged, 1015.
—Private ownership discussed, 872; Comments on, 850.
—Transportation discussed, 835.

Charles A. Coffin Foundation:
—General Electric Co. employees awards, 477.
—Grand Rapids Ry. to enter contest, 665.
—Title for 1926 presentations chosen, 788.

Charleston, S. C.:
—South Carolina Power Co.:
  Rehabilitation program [Bigelow], c339.

Charleston, W. Va.:
—Charleston Interurban R.R.:
  Bond-testing methods [Albert], 1005.
  Cold steam process for car cleaning [Albert], c908.

Charlotte, N. C.:
—Piedmont & Northern Ry.:
  Extensions, planned, 1112; Comments on, 153.
  Railway extension route changed, 749.
—Southern Public Utilities Co.:
  Armature bearing press, *615.
  Car built in shops, 442.

Chattanooga, Tenn.:
—Chattanooga Traction Co.:
  Clearing indicator for signals [McDonald], *912.
—Tennessee Electric Power Co.:
  Annual report, 1015.
  Bus and vehicle maintenance [Reed], *515.
  Safety course for employees, 907.
  Transit survey report, 713.

Chautauqua Traction Co. (see Jamestown, N. Y.):
Chicago, Aurora & Elgin R.R. (see Aurora, Ill.):

Chicago, Ill.:
—Bus hearing, 59.
—Bus operating proposal [Richardson], [Schorn], c171.
—Chicago City Ry.:
  Bond interest to be paid, 978.
  Financial situation, 60.
  Quarterly dividend omitted, 631.
—Chicago & Interurban Traction Co.:
  Service suspended, 755.
—Chicago Railways:
  City intervenes in receivership, 62.
  Financial report, 1159.
  Foreclosure asked, 311.
  Franchise controversy, 92, 259.
—Chicago Rapid Transit Co.:
  Bond issue, 929.
  Electrical maintenance methods, Details [Smith], *511, *682.
  Employees insured, 1086.
  Financial report, 840, 1156.
  First-aid training school, 156, 857.
  Preferred stock sale, 311.
  Shop construction progress, 502, *802.
  Station platforms lengthened, 926.
  Students must pay for car damage, 924.
  Terminal work begun, 587.
  Train movement during rush hours, 178.
  Wage increase asked, 973, 1153.
—Chicago Surface Lines:
  Accident prevention prize awards, 667.
  Automatic substation, 800; Details [Noah], *863.
  Buses to be installed, 1114.
  Cars ordered, Specifications, *271.
  Concrete loading platform construction extended [Traiser], *816.
  Day-to-day franchise granted, 217, 259.
  Equipment in operation for holidays, *10.
  Fageol coach tested, 469.
  Financial report, 97, 553, 797.
  Inspection methods, Details [Shaughnessy], *492.
  Paving case decision, 142.
  Personnel changes, 593.
  President Sawyer's address to employees, 835.
  Schedule adjustments for summer [Traiser], *869.
  Snow plow built in shops, Design, Details [Wheeler], *286.
  Track maintenance, Details [Wolfe], 618.
  Wage increase negotiations, 973, 1060, 1153.
—Electrification in suburbs, Plans, 712.
—Home rule referendum, 549, 665.
—Illinois Power & Light Co.:
  Annual report, 1158.
  Insurance policies given employees at Christmas, 142.
  Kewanee system described, 926.
  New franchise in Danville, Ill., 180.
  One-man cars reduce accidents [Palmblade], 580; Comments on, 600.
  Refunding of power debentures proposed, 145.
—Illinois Traction System:
  Car maintenance [Barnhart], 617.
  Chicago-Central Illinois through service agreement, 625.
  Clean station awards, 1043.
  Highway crossing construction, Details, *379.
  Modernization methods, 135.
  Wage arbitration, 141, 837.
—Mayoralty election, 665.
—Municipal ownership of surface lines proposed, 54, 586.
—Parking restrictions, Counsel ruling, 666.
—Pedestrian jaywalker survey, 878; Comments on, 851.
—Rubber markers for safety islands, 1039.
—South side surface lines to pay bond interest, 225.
—Street traffic survey, 170.
—Subway plans progress, 393, 429, 1111.
—Traction enabling legislation, 836, 877, 921, 1001, 1058, 1152.
—Traction fund payments, 750.
—Traction ordinances delayed, 428.
—Traction unification favored by motor company, 1061.
—Traffic code explained [McIlraith], c957.
—Traffic regulations [McIlraith], 619.
—Traffic signal control, Details [Traiser], *991.
—Traffic signals improved, *772.
—Traffic survey, Report, *70, 107; Comments on, 69.
—Transit plans, [Ritchie], c52, 139, *154; Comments on, 3, 152, 231.
—Transportation situation, Survey of, 177, 786; Comments on, 937.

Chicago & Joliet Electric Ry. (see Joliet, Ill.).
Chicago, North Shore & Milwaukee R.R. (see Highwood, Ill.)

Chicago & Northwestern Ry.:
—Storage-battery locomotive test, Details, *83.
Chicago, South Shore & South Bend R.R. (see South Bend, Ind.).
Chicago & West Towns Ry. (see Oak Park, Ill.).

Cincinnati, Ohio:
—Cincinnati, Georgetown & Portsmouth R.R.:
  Receiver appointed, 310.
  Receiver's sale, 798.
  Reorganization plans, 1015.
—Cincinnati, Hamilton & Dayton Ry.:
  Annual report, 840; Comments on, 851.
  Carhouse purchased, 402.
  Interurban cars ordered, Details, 315.
  Reorganization commemoration, 1110; Details, 1151; Comments on, 1126.
—Cincinnati Street Ry.:
  Bond issue, 717.
  Budget for 1927, Details, 60.
  Bus operating losses, 396.
  Bus operating plan, 470; Comments on, 445.

Cincinnati, Ohio:
—Cincinnati Street Ry. (Continued):
  Bus substitution rejected by voters, 433.
  "Carhouse" cars carry passengers, 1112.
  Car interiors remodeled, Details, *609.
  Financial report, 471, 976.
  New emblem adopted, 56.
  Repair shop construction begun, 846.
  Social agencies advertised in cars, 666.
  Track reconstruction program, Details, *903.
—New traffic regulations, Details, 1031.
—Taxicab regulations, 716.
—Transit report, 924.
Circuit breakers:
—Montreal, Can., Automatic substation, *766.
Cleveland, Ohio:
—Cleveland Ry.:
  Aluminum experimental car, Details, *655; Comments on, 639.
  Bus purchase plans, 1166.
  Capital stock increased, 755.
  Car station construction, Details, *247.
  Franchise negotiations, 354.
  Improvement program, 261.
  Overhead material inspection methods [Scott], *896.
  Suburban fare controversy, 923.
—Cleveland, Southwestern Railway & Light Co.:
  Public relations work, *820.
—Industrial exposition, Plans for, 596.
—Lake Shore Electric Ry.:
  New franchise sought, 788.
  Personnel changes, 269.
  Pole setting methods, *958.

Clinton, Davenport & Muscatine Ry. (see Davenport, Iowa).
Coffin Prize (see Charles A. Coffin Foundation).

Columbia, S. C.:
—Columbia Railway, Gas & Electric Co.:
  Service suspended, 555, 711.
—Transit situation, 1061.

Concord, Mass.:
—Concord Street Ry.:
  Radio interference reduced [Crawford], 969.

Connecticut Co. (see New Haven, Conn.).
Conspectus of indexes, 185, 398, 592, 754, 978, 1158.

Coral Gables, Fla.:
—Coral Gables Rapid Transit Co.:
  Approval sought for sale, 359.
  Sold to city, 631.

Cumberland County Power & Light Co. (see Portland, Me.).

Czechoslovakia:
—Electric railway practice, Details [Neithammer], *79.

D

Dallas, Texas:
—Dallas Railway & Terminal Co.:
  Bus capacity tax questioned, 434.
  Cars, Specifications, *189.
  Customer ownership sale, 266; Results, Details [Meriwether], *777.
—Dallas Southwestern Traction Co.:
  Franchise extended, 587.
  Time extended for construction, 440.
—Texas Electric Ry.:
  Annual report, 309.
Danville, Va.:
—Danville Traction & Power Co.:
  Adjustable collar for axle bearings, *292.
  Axle-bearing maintenance, *425.

Davenport, Iowa:
—Clinton, Davenport & Muscatine Ry.:
  Radio talk on service problems, 453.
—Tri-City Ry. of Iowa:
  Bus operation successful, Details, 182.
  Personnel changes, 147, 314.
—Utility building, Details, *55.
Dayton, Ohio:
—Dayton Power & Light Co.:
  Energy consumption survey, Details, 741.
—Dayton & Western Traction Co.:
  Refinancing completed, 398.

Denver, Colo.:
—Denver & Interurban R.R.:
  Foreclosure, 185, 399.
—Denver Tramway:
  Excess paving costs to be paid, 925.
  Fare controversy, 179.
  Franchise negotiations, 92.
  Hazards of street work [Matthews], c957; Comments on, 987.
  Headway recorders in dispatcher's office, Details [Love], *419.
  Paper distributed on cars, 393.
  Rate making vs. sales value defined, 978.
  Refinancing program, Details, 754.
Department of Street Rys. (see Detroit, Mich.).

Des Moines, Iowa:
—Des Moines City Ry.:
  Clean, bright cars affect riding [McMahon], c575.
  One-man car case, Decision, 548, 585; Rehearing, 1058.
  Weekly pass riders increase, 248.
Detroit, Mich.:
—Department of Street Railways:
  Accident reduction campaign results, 1004.
  Bus competitors attacked by Mayor, 308.
  Bus service, Importance of, 791.
  Car and bus bids asked, 723.
  Carhouse property sale, Bids received, 792.
  Car purchase plans, 678.
  Car stanchion maintenance [Williams], *615.
  Financial reports, 397, 592, 797, 929.
  Gas-electric coaches, Design, *188.

READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX

Abbreviations: *Illustrated. c Communications.

Detroit, Mich.:
—Department of Street Railways (Continued):
  Identification numbers for trainmen, 926.
  Lubrication of center bearings [Williams], *1092.
  New financial policy necessary, Details, 140.
  Paving relief defeated, 261, 393, 665; Comments on, 765.
  Personnel changes, 675.
  Reaudit of books asked, 184; Comments on, 192.
—Detroit, Toledo & Ironton R.R.:
  Gas-electric cars installed, *847.
—Detroit United Ry.:
  New receiver appointed, 225.
  Operating agreement in Pontiac, 1012.
  Partial abandonment, 1063.
  Power equipment sold, 311.
—Lord Ashfield comments on transportation, 219.
—Monorail construction proposed, 879.
—Rapid transit report, 91.
—Subway plan, Vote deferred, 587.
Dick Prescott, *132, *342, *702, *917, *1100.
Discontinuance of lines:
—Abandonments in 1926, Statistics, *43; Comments on, 2.
—Auburn, N. Y., 754.
—Bellingham, Wash., 356.
—Chicago & Interurban Traction Co., 755.
—Columbia, S. C., 555, 711, 1061.
—Detroit United Ry., 1063.
—Evansville, Ind., 1061.
—Fredonia, N. Y., 841.
—Grand Rapids, Mich., Abandonment arouses former patrons, 217; Comments on, 191.
—High Point, N. C., 552, 928.
—Hudson, N. Y., 308.
—Huntington, L. I., 628.
—Jamestown, N. Y., Liquidation under way, 224.
—Las Vegas, N. M., 266.
—Manitowoc and Two Rivers, Wis., 356.
—Milford & Uxbridge Street Ry., 222.
—Morristown, N. J., Proposal, 356; Comments on, 319.
—Newark, Ohio, 138; Comments on, 107.
—Paris, Texas, 882.
—Peterboro, Ont., 789.
—Shawnee, Okla., 143.
—Tampico, Mexico, 672.
Dispatching:
—Headway recorders in dispatcher's office, Denver, Colo. [Love], *419.
—Highwood, Ill., Centralized train control, 925; Details, 956.
—Rome, Italy, Details [Blake], *935.
Doors, Car:
—Treadle:
  Use on one-man cars [Frehse], 254.
Duluth, Minn.:
—Duluth Street Ry.:
  Fare controversy, 711.
—Duluth-Superior Traction Co.:
  Annual report, 671.
  Dividends resumed, 1063.
  One-man car accident, 140, 354.

E

Eastern Massachusetts Street Ry. (see Boston, Mass.).
Eastern New York Utilities Corp. (see Albany, N. Y.).
East St. Louis, Ill.:
—East St. Louis Ry.:
  Rebuilt cars, 879; Details, *1000.
—East St. Louis & Suburban Ry.:
  Bus competitor abandons operation, 669.
  Fares decreased in lean hours, 1060.
  Highway crossing made of old rail [Baker], *812.
  Motor coach maintenance [McDonald], 545.
  Sunday pass system, 549; Comments on, 601.
Education:
—Akron, Ohio, Bus school, Details, *1002.
—A.E.R.A. committee work, Comments on, 366.
—Boston, Mass., Courses, 1154.
—Chicago, Ill., First-aid training courses, 156.
—Conference leaders to be trained, Comments on, 1072.
—Electrical farm equipment demonstration, Indiana, 448.
—Foremen conferences help [Norris], c86.
—London, England, Signal school, Details, *1003.
—Public utility information pamphlets, Ohio, 142.
—Training transportation salesmen, Comments on, 444.
—University courses:
  Harvard, Course for utility executives, 468; Dedication, 1060.
  Northwestern University, 1113.
Eighth & Ninth Avenues Ry. (see New York City).
Electrical equipment:
—Chicago, Ill., Construction and maintenance methods [Smith], *682.
—Condulet cover, Wedge-nut fastening (Crouse-Hinds), *745.
—Controllers, Improvements in [Axtell], 254.
—Electro-pneumatic devices on Springfield, Mass. experimental car, *859.
—Jumper fuse location, B.-M. T., 87.
—Mica undercutter, Portable, *426.
—Signal panel for water alarm (G.-E.), 1007.
—Springfield, Mass. experimental car, Details, *562; Comments on, 559.
Electric Railway Association of Equipment Men, Southern Properties:
—Annual meeting, Report, 253; Comments on, 317.
Electric Railway Association of Equipment Men, Southern Properties (Continued):
—Manufacturers admitted, 427.
—Pull-in record, 250, 342, 745, 871.
—"Pull-in" rules [McWhorter], c128; Comment on, 318.
—Semi-annual meeting, Report, 216.
Electric Railway Journal:
—Annual Maintenance Issue, Readers' comments, 610, 702.
—Maintenance data contest, 700, 743, 782, 823, 870, 959, 1006, 1048, 1147; Judges, *910.
—Prize announced, *1090.
El Paso, Texas:
—El Paso Electric Ry.:
—Maintenance prize won by A. Tawrman, *1090.
  Depot service, *902.
  Publicity program, Details [Muse], *163; Comments on, 192.
Employees:
—Accident prevention bonus system, Brooklyn, N. Y. [Hodges], 215.
—Advancement of, Comments on, 1127.
—Automobiles, Use by industrial workers, Comments on, 986.
—Beaumont, Texas, Story told to new men [Brann], 834.
—Brooklyn, N. Y., Laundry drier for wet uniforms, 956.
—Buffalo, N. Y., Sick benefits, 1046.
—Chicago, Ill., First-aid training courses, 156.
—Courtesy contest, Salt Lake City, Utah, 219.
—Employee ownership advantages, Comments on, 1025.
—Environment affects work, Comments on, 892.
—General Electric employees receive supplementary compensation, 315.
—Highwood, Ill., Awards for business tips, 667.
—Huntington, W. Va., Recreation rooms for, *422.
—Los Angeles, Cal., Bonus to trainmen, 94.
  Merit system, Details, *1139.
—Louisville, Ky., Connelly Award for public service, 221.
—New Brighton, Pa., Twenty-five-year men banqueted, *465.
—P. R. T. employee ownership statement, 61.
—Poor tools cause accidents to, 502.
—Prize awards, Value of, Comments on, 986.
—Profit-sharing plan, Fifth Ave. Coach Co., 629.
—Psychological tests urged by Dr. Gilbreth, 595.
—Public relations affected by, Comments on, 406.
—Recreation improves work, Comments on, 804.
—Relief and loan plan, General Electric Co., 102.
—Rochester, N. Y., Service record, 995.
—Safety course for platform men, Chattanooga, Tenn., 907.
—St. Louis, Mo., Loan Association dividend, 566; Report, 858.
—Salt Lake City, Utah, 25-year veterans celebrate, *667.
—South Bend, Ind., Better business prizes, *1111.
—Toledo, Ohio, New uniforms, *714.
—Training as salesmen, Comments on, 444.
—Training employees [Sarre], 831.
—Training of apprentices, Comments on, 106.
—U. S. Chamber of Commerce discusses employee relations, 872; Comments on, 850.
Energy consumption:
—Dayton, Ohio, Survey, 741.
England (see Great Britain).
Erie, Pa.:
—Buffalo & Erie Ry.:
  Bus purchase ratified, 975.
  Wage arbitration, 837.
  Paving method, Details, *331.
European practice:
—Australia railway advertising, 613.
—Czechoslovakia, Railway practice, Details [Neithammer], *79.
—Light metal for car construction, 819.
—Rail corrugation, Effect of abrasion and compression [Fremont], *283.
—Rail corrugation, Study of, Details [Ewing], 281.
—Rome, Italy, Operating details [Blake], *945; [Raymur], c1145.
Evansville, Ind.:
—Evansville & Ohio Valley Ry.:
  Abandonment sought, 1061, 1115.
—Southern Indiana Gas & Electric Co.:
  Cars named after first settlers, 866.

F

Fare collection:
—Buffalo, N. Y., New transfer system, 1011.
—One-man fare collection methods [Weyman], 1053.
—San Diego, Cal., System, Details, *1028.
—Sunday pass:
  East St. Louis, Ill., 549; Comments on, 601.
—Weekly pass:
  Des Moines, Iowa, Use increases, 248.
  Norfolk, Va., Simplified form, *815.
  Pittsburgh, Pa., Campaign to promote, Details, *194; Comments on, 191.
  San Diego, Cal., Details, *1028.
  Terre Haute, Ind., Discontinuance sought, 836.
  Wheeling, W. Va., Sales increased, 305.
Fare decreases:
—Coffeyville, Kans., 307.
—East St. Louis, Ill., 1060.
—Johnson City, Tenn., 627.
—Lynchburg, Va., 432.
—Nashville, Tenn., 469.
—Pittsburgh, Pa., 93.
Fare increases:
—Albany, N. Y., 1110.
Fare increases (Continued):
—Buffalo, N. Y., Commission approves, 428, 1109, 1151.
—Burlington, Iowa, 669.
—Clarksville, Tenn., 433.
—East St. Louis, Ill., Bus, 716.
—Fort Worth, Texas, 307, 391; Comments on, 366.
—Framingham, Mass., 550.
—Highwood, Ill., 585.
—Houston, Tex., 1110.
—Ironwood, Mich., 94.
—Lincoln, Neb., 837.
—Macon, Ga., 669.
—New Bedford, Mass., 587, 926.
—Norfolk, Va., 56.
—Northampton, Mass., 880.
—Ogden, Utah, 588, 751.
—Oneida, N. Y., 667.
—Petersburg, Va., 56.
—Port Chester, N. Y., Bus, 715.
—Rome, N. Y., 180.
—St. Louis, Mo., 303.
—Sanford, Me., 181.
—San Francisco, Cal., 93.
—Sioux City, Iowa, 394.
—Syracuse, N. Y., 260, 303; Comments on, 273.
—Watertown, N. Y., 180.
—Wichita, Kans., 974.

Fares:
—Albany, N. Y., Fare controversy, 141, 468, 881, 1153.
—A.E.R.A. figures, 1925-26, 265; 670, 841, 1062.
—Binghamton, N. Y., Controversy, 751.
—Buffalo, N. Y., Controversy, 93, 220, 712, 973, 1109; Comments on, 986.
—California rate cases, 971.
—Conspectus of indexes, 185, 398, 592, 754, 978, 1158.
—Denver, Colo., Controversy, 179.
—Denver, Colo., Rate making vs. sales value defined, 978.
—Duluth, Minn., Controversy, 711.
—Fare earnings in Missouri, 1915-25, 62.
—Fare hearings, Comments on, 939.
—Fare requirements [Storrs], 828; [Sawyer], 830.
—Fort Worth, Texas, Fare revision asked, 142
—Framingham, Mass., Passengers petition for decrease, 749, 1112.
—Glasgow, Scotland, Graded fares, 395.
——Houston, Texas, Adjustment, Details, 464, 1110.
—Kansas City, Mo., Fare changes sought, 786.
—Knoxville, Tenn., Arrangement popular, 355.
—London, Ont., Increase sought, 712.
—Los Angeles, Cal., Controversy, 261, 432, 548, 713, 749.
—Modernization affects [Gordon], 1087.
—Newark, N. J., Fare controversy, 91, 394, 624.
—Oakland, Cal., Fare controversy, 921.
—Pacific Electric Ry., Schedule amended, 973.
—Pasadena, Cal., Fare issue lost in Supreme Court, 56.
—Pittsburgh, Pa., Fare changes [Boyce], 1055.
—Portsmouth, Ohio, Fare arrangement, *1133.
—Rate regulation, Principles and methods, Comments on, 681.
—Reproduction costs as rate making basis [Goldberg], 965.
—Rochester, N. Y., Hearings, 91.
—St. Louis, Mo., Controversy, 177, 259, 393, 428, 466, 711, 787, 972, 1059.
—Schenectady, N. Y., Commutation ticket sought, 178.
—Seattle, Wash., Short haul 5-cent fare system, 1013.
—South Bend, Ind., Excursion rates, 789.
—Syracuse, N. Y., Controversy, 393.
—Tacoma, Wash., Fare changes, 353, 837.
—Trend in 1926 [Richey], *28; Comments on, 68.
—Zone fare system, San Diego, Cal., Details, *1028.
Farm demonstrations by interurban, Indiana, 448.
Fifth Avenue Coach Co. (see New York City).

Financial:
—Baltimore, Md., Railway refinancing, 399, 929.
—Bond issues and maturities, 1926, *31; Comments on, 3.
—Bond issues, Comments on, 727.
—Boston Elevated Ry., Financial readjustment suggested, 144.
—Boston & Worcester financial situation, 225.
—B.-M. T. seeks refunding issue, 882.
—Brooklyn, N. Y., Dividend deferred, Details, 225, 882.
—Canadian railway operations, Survey, Details, *852; Comments on, 849.
—Chicago City Ry. dividend omitted, 631.
—Chicago, Ill., Financial features of the Blair transit plan, *154; Comments on, 152.
—Chicago Rys. receivership, Petition filed by City, 62.
—Chicago Rapid Transit bonds offered, 929.
—Cincinnati Street Ry. budget for 1927, 60.
—Cleveland Ry. increases capital stock, 755.
—Corporate readjustments, Comments on, 726.
—Customer-ownership campaign, Results, 357.
—Dayton & Western refinancing, 398.
—Day & Zimmermann, Inc., Changes hands, 1116.
—Denver, Colo., Refinancing program, 754.
—Detroit United Ry. power equipment sold, 311.
—Development of miscellaneous revenue [Boyce], 1055.
—Equipment trust certificates issued, Philadelphia, Pa., 265.
—Expenditures, Railway estimate, 1927, *11; Comments on, 2, 68.

Financial (Continued):
—Foreclosure:
  Chicago Rys., 311.
  Cincinnati, Georgetown & Portsmouth Ry., 798.
  Denver & Interurban Ry., 185, 399.
  Fort Wayne, Van Wert & Lima Traction Co., 310.
  Morris County Traction Co., 631, 840, 1063.
  Murphysboro & Southern Illinois Electric R.R., 1017.
  Review for 1926, *40; Comments on, 67.
  United Rys. of St. Louis, 435, 670, 792, 978, 1017.
  Washington-Virginia Ry., 266, 435, 882.
—Foshay Company changes corporate structure, 718.
—Georgia utilities consolidated. Details, 223, 435.
—Indianapolis, Ind., Merger plans, 1156.
—Inland Empire Ry. sold to Great Northern, 929.
—International Utilities offer for Lethbridge Ry., 753.
—Mitten Bank merger, Philadelphia, Pa., 878.
—National Public Service Corp. control changes hands, 553, 631.
—Newark, N. J., Railway budget for 1927, 307.
—New money for utilities, Comments on, 407.
—New York City subway construction contracts, 1157.
—No-par-value stock, Comments on, 406.
—Ohio electric railway budgets for 1927, 440.
—Omaha, Neb., Bond extension, 1117.
—Public debt, Comments on, 445.
—Railway costs and fares in 1926 [Richey], *28; Comments on, 68.
—Receiverships:
  Auburn & Syracuse Electric R.R., 471.
  Chicago Rys., Petition filed by city, 62.
  Cincinnati, Georgetown & Portsmouth R.R., 310.
  Eighth & Ninth Avenues Ry., 841.
  Empire State R.R., 840.
  Grand View R.R., 146.
  Purple Swan Safety Coach Lines, 58, 308, 469.
  Record for 1926, Statistics, *40; Comments on, 67.
  Union Traction Co., Coffeyville, Kans., 144.
—Reorganization:
  Boston Elevated Ry., 223; 357.
  Boston & Worcester Street Ry., 665.
  Cincinnati, Portsmouth & Georgetown R.R., 1015.
  Fitchburg & Leominster Street Ry., Details [Baker], *738; Comments on, 765.
  Fort Wayne, Ind., Methods [Feustel], 296; Comments on, 367.
  Fort Wayne, Van Wert & Lima Traction Co., 97, 310.
  Framingham, Mass., 753.
  Georgia Power Co., 435.
  Grand Rapids, Holland & Chicago Ry., 217, 260, 466, 624, 1060; Comments on, 191.
  Grand Rapids Ry., 718, 882, 929, 978; Comments on, 726.
  Groton & Stonington Traction Co., 265.
  Kansas City, Lawrence & Topeka Electric R.R., 720.
  Kansas City Rys. Review, 632, 1156.
  Norfolk, Va., 435.
  Oklahoma Ry., 266.
  Phoenix Street Ry., 550.
  Porto Rico Rys., Ltd., 435.
  Rockford, Ill. railways, 311, 798.
  Springfield Street Ry., 359.
  United Rys., St. Louis, Mo., 97.
  West Chester, Pa. bus lines, 552.
  Wichita Railroad & Light Co., 436.
  Williamsport Passenger Ry., Details, *728; Comments on, 765.
—St. Louis, Mo., Building & Loan Assn. report, 858.
—St. Paul, Minn., Railway earnings, 1926, 184.
—San Francisco, Cal., Bond extension controversy, 712.
—San Francisco Municipal Ry. situation, 306.
—Seattle, Wash., Bond redemption plan, 358, 464.
—Toronto, Can., Radial railway control, 265.
—Toronto Ry. liquidation dividend, 792.
—W. B. & A. control changes hands, 1015.

Financial reports:
—Akron, Ohio, 1117.
—Allentown, Pa., 883.
—Albany, N. Y., 1118.
—Alliance, Ohio, 592.
—Annual reports for 1926, Comments on, 639.
—Baltimore, Md., 930.
—Berkshire Street Ry., 1116.
—Boston Elevated Ry., 264; Comments on, 1127.
—California bus report [McCabe], *866.
—Canadian railways, Survey, Details, *852; Comments on, 849.
—Capital Traction Co., 1063.
—Chicago Railways, 1158.
—Chicago Rapid Transit Co., 840, 1156.
—Chicago Surface Lines, 97, 553, 797.
—Chicago & West Towns Ry., 472.
—Cincinnati Street Ry., 471, 976.
—Columbus, Ohio, 359.
—Community Traction Co., 1159.
—Connecticut Co., 1116.
—Department of Street Rys., Detroit, Mich., 397, 592, 797, 929.
—Duluth-Superior Traction Co., 671.
—Eastern Massachusetts Street Ry., 719.
—Electric railway operations in 1926, A.E.R.A. report, 792; Comments on, 764.
—Engineers Public Service Co., 471.
—Fort Wayne, Ind., 1118.
—Grand Rapids, Mich., 223; Comments on, 193.
—Hamilton, Ohio, 840; Comments on, 851.
—Highwood, Ill., 755.
—Illinois Power & Light Corp., 1159.

Financial reports (Continued):
—Indianapolis Street Ry., 930.
—International Ry., 398.
—London, Ont., 1160.
—Louisville Ry., 630.
—Market Street Ry., 630.
—Milwaukee, Wis., 358.
—Montreal Tramways, 977; Comments on, 938.
—Municipal Ry. of San Francisco, 144.
—Newark, N. J., 1016.
—New York, New Haven & Hartford R.R., 1116.
—New York State Rys., 60, 310.
—Oklahoma Ry., 224.
—Ottawa Electric Ry., 670.
—Philadelphia Rapid Transit Co., 590, 930.
—St. Joseph, Mo., 670.
—Sioux City, Iowa, 883.
—Springfield, Ill., 929.
—Tampa, Fla., 842.
—Tennessee Electric Power Co., 1015.
—Texas Electric Ry., 309.
—Twin City Rapid Transit Co., 436; Comments on, 407.
—United Rys., St. Louis, Mo., Auditor's report, 717.
—Washington, Baltimore & Annapolis Elec. R.R., 1157.
—Washington Railway & Electric Co., 397.
—West Penn Rys., 632.

Fire equipment locations, Grand Rapids, Mich., *424.

Fire prevention:
—Proposed garage protection legislation [George], c868; Comments on, 849.
—San Francisco, Cal., Fire truck, *1137.

Fitchburg, Mass.:
—Fitchburg & Leominster Street Ry.:
  Reorganization details [Baker], *738; Comments on, 765.

Fitkin utility managers convention, 181.

Florida:
—Franchise laws, Comments on, 939.

Fonda, Johnstown & Gloversville R.R. (see Gloversville, N. Y.).

Fort Wayne, Ind.:
—Fort Wayne & Northern Indiana Traction Co.:
  Financial reorganization, Details [Feustel], 296; Comments on, 367.
—Fort Wayne, Van Wert & Lima Traction Co.:
  Reorganization, 97, 310.
—Indiana Service Corporation:
  Air equipment testing methods, [Reddersen], *338.
  Annual report, 1118.
  Attractive cars popularized service [Bucher], c249.
  Bus line abandonment sought, 716.
  Plant exhibited to the public, *305.

Fort Worth, Texas:
—Northern Texas Traction Co.:
  Crimson limited train installed, 394.
  Crimson Limited train overhauled, Details [Hoskins], *246.
  Dallas-Fort Worth bus service, 1155.
  Fares increased, 142, 307, 391; Comments on, 366.
  Radio used as advertising medium, 242.

Framingham, Mass.:
—Boston & Worcester Street Ry.:
  Bus substitution petition, 434.
  Fare increase, 550.
  Financial situation, 225.
  Passengers petition fare decrease, 749, 1112.
  Reorganization plan, 665; Details, 753.

France:
—Electrification progress, 221, 628.
—Paris:
  Schedule speeds of tramway and bus, Details [Mariage], *157; Comments on, 152.
—Paris-Orleans locomotive, Details, *458.
—Quick-setting cement, Details, *386.

Franchises:
—Buffalo, N. Y., Bus franchise, 183.
—Buffalo, N. Y., Controversy, 138, 924.
—Canton, Ohio, Negotiations, 307.
—Chicago, Ill., Controversy, 92, 139, 259; Comments on, 233.
—Chicago, Ill., Day-to-day agreement, 217.
—Cleveland, Ohio, Negotiations, 354.
—Dallas, Tex., Franchise extended, 587.
—Danville, Ill., New franchise, 180.
—Denver, Colo., Negotiations, 92.
—Florida laws, Comments on, 939.
—Illinois, Terminable permit, 92, 548; Comments on, 68.
—Kansas City, Mo., Negotiations, 93, 180, 220, 392, 466, 584, 712.
—Liberty-Kansas City railway receives franchise, 431.
—Minneapolis, Minn., Bus concessions, 589.
—New York City bus franchise negotiations, 58, 222.
—Omaha, Neb., Negotiations, 56, 428, 468, 750, 1060, 1154.
—Philadelphia, Pa., Frankford line lease controversy, 304.
—Philadelphia, Pa., Ordinances passed, 585.
—Richmond, Va., Change made, 431.
—Rochester, N. Y., Service-at-cost franchise sought for buses, 183.
—Rockford, Ill., New franchise, 220.
—St. Louis, Mo., Service-at-cost franchise discussed [Bonbright], [Nash], c290; Comments on, 274.
—Sandusky, Ohio, Negotiations, 788.
—Staten Island, N. Y., Bus franchise situation [Reifschneider], c459.
—Tacoma, Wash., Agreement on change methods, 586.
—Toledo, Ohio, Negotiations, 393, 787, 1109.
—Winnipeg, Can., Situation, 353.

Freight and express:
—Anderson, Ind., Collect-on-delivery service, 1110.

Freight and express (Continued):
—Aurora, Ill., Service improved, 1110.
—Condition and repair of freight cars, C.E.R. M.M.A. rules, *961.
—Express service by railways in conjunction with freight [Brown], *161.
—Ton-mile freight cost, Determination of [Cole], 813.

Fuels:
—Coal consumption tonnage, 1165.
—Coal stocks nullifies strike menace, 982.
—On industry situation, Comments on, 1125.

G

Garages:
—Chattanooga, Tenn., New garage and repair equipment [Reed], *515.
—Gary, Ind., Plans for, 395.
—Lexington, Ky. [Plimpton], *234.
—Proposed fire protection regulations [George], c868; Comments on, 849.
—Rockford, Ill., 1166.
—Waterbury, Conn., Details, *446.

Gary, Ind.:
—Gary Railways:
  Bus route extensions, 59, 881.
  Customer-ownership campaign, Results, 357.
  Equipment trust issue, 976.
  Express bus route abandonment sought, 1014.
  Fare increase sought, 551.
  New cars, Specifications, *210.
  One-man cars ordered, 228.
—Shore Line Motor Coach Co.:
  Coach company purchased, 222.
  Garage construction plans, 395.

Gears and pinions:
—Gear-center distances, maintenance [Pontius], *899, *1080; Comments on, 1071.

General Electric Co. wins Sesquicentennial prizes, 148.

Georgia Railway & Power Co. (see Atlanta, Ga.).

Germany:
—Berlin Street Ry.:
  Axle brakes and heaters in new cars, Details, *174.
  Car improvement program, Details [Pforr], *203, *243.
  Car painting methods, 528.
—Rhenish-Westphalian rapid transit line, Construction progress [Cauer], *1131.

Glens Falls, N. Y.:
—Hudson Valley Ry.:
  Abandonment hearing, 62.

Gloversville, N. Y.:
—Fonda, Johnstown & Gloversville R.R.:
  Condemnation figure protested, 397.

Government ownership:
—Discussed by Southwestern Public Service Assn., 827; Comments on, 803.
—U. S. Chamber of Commerce discusses, 873; Comments on, 850.

Grand Rapids, Holland & Chicago Ry. (see Holland, Mich.).

Grand Rapids, Mich.:
—Elimination of downtown parking suggested, 776.
—Grand Rapids Ry.:
  Annual report, 223, Comments on, 193.
  Armature handling truck, *744.
  Car wheel buggy, *525.
  Coffin Award for 1927 entered, 665.
  Fire equipment locations, *424.
  New Year's card receives favorable comment, *180.
  Paving relief measure lost, 585.
  Publicity campaign for paving referendum, 627.
  Reorganization plans, 718, 882, 929, 978; Comments on, 726.
  Snow scraper and sweeper combined, *380.
  Tail light on cars locked in place, *251.
  Welding worn brake beams, *344.

Grandville, Mich.:
—United Suburban Ry.:
  Officers elected, 675.

Great Britain:
—Bradford Corporation Tramways:
  Car designed for quiet operation, Details, *817.
—Glasgow, Scotland:
  Graded fares, 395.
  Single-deck car revenue, *566.
—Ipswich, England, Trackless trolley, Design, *996.
—Keighley, England, Accident reduction, 221.
—Liverpool report on bus and trams, 395.
—London Underground Rys.:
  Extension causes land boom, Comments on, 193.
  Signal school, Details, *1003.
—Metropolitan Electric Twys. increase car speed, 1154.
—Railway and bus competition, 1154.
—Tax relief from tramway revenue, 1154.

Great Northern Ry.:
—Bus service curtailed, 59.
—Electrification progress, 637.
—Equipment plans for 1927, 148.
—Giant electric locomotive put in service, 363.
—Inland Empire Ry. purchase approved, 929.

Greensboro, N. C.:
—North Carolina Public Service Co.:
  Construction truck built, Design, *613.
  Workbenches improve working conditions, *293.

Groton & Stonington Traction Co. (see Mystic, Conn.).

H

Hamilton, Ont., Can.:
—Hamilton Street Ry.:
  Cars ordered, Specifications, 104.

READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX
Abbreviations: *Illustrated. c Communications.

Hampton, Va.:
—Newport News & Hampton, Ry., Gas & Elec. Co.:
Cars rebuilt for one-man operation, 188.
Compressor brush storage, *825.

Harrisburg, Pa.:
—Harrisburg Railway:
Car washing methods, Details [Rexroth], *341.
Line construction truck, *1146.
Maintenance cost reduced, Methods, *329.

Hazleton, Pa.:
—Wilkes-Barre & Hazelton Ry.:
Metal car steps reduce maintenance, *661.
Safety guards on shop machinery, *906.
Wheels, Pressing on methods, *331.
Heaters, Electric:
—Berlin, Germany, *174.
—For repair shops (Railway Utility), *707.
Heavy electric traction:
—Brenner electrification, Austria-Italy, Progress, 394.
—Czechoslovakia, Details [Neithammer], *79.
—French electrification progress, 221.
—Chicago, Ill., Suburban electrification plans, 712.
—Economics of railroad electrification [Withington], 1008.
—French electrification halted by lack of funds, 628.
—Great Northern Ry. electrification progress, 637.
—Long freight trains [Withington], c86.
—Mexican Ry., Electrification progress, 440.
—Poland, Electrification progress, 394.
—Switzerland, Electrification progress, *43, 394.

Hicksville Railway, Adventures of Old Man Trouble, *120, *340, *547, *699, *909, *1097.

Highwood, Ill.:
—Chicago, North Shore & Milwaukee R.R.:
Annual report, 755.
Awards for business tips, 667.
Centralized train control, 924, 956.
Fare increase, 585.
Free parking space furnished, 430.
Illuminated signboard advertises service, 586.
Improvements on Skokie Valley route, 550.
New station opened, Details, 57, *238.
Personnel changes, 476.
Rehabilitation plans, 54.
Trolley storage-battery locomotives ordered, *1023.

Holland:
—Trackless trolley, railway and bus operations compared, *612.

Holland, Mich.:
—Grand Rapids, Holland & Chicago Ry.:
Rehabilitation progress, 217, 260, 466, 624, 1060; Comments on, 191.

Holyoke, Mass.:
—Holyoke Street Ry.:
Suit won against bus competitor, 434.

Houston, Texas:
—Houston Electric Co.:
Fare adjustment, 464, 877, 1110.
Newspaper advertising campaign, 626.
—Houston North Shore Ry.:
Construction progress, 468.
Passenger service begun, 1113.

Hudson Valley Ry. (see Glens Falls, N. Y.):

Huntington, W. Va.:
—Ohio Valley Electric Ry.:
Recreation rooms for trainmen, *422.

I

Illinois Electric Railway Association:
—Annual meeting, Report, 579.
Illinois Power & Light Corp. (see Chicago, Ill.):
Illinois, State of:
—Home rule bills discussed by utilities assn., 579.
—I.C.C. truck competition hearings, 589.
—Terminable permit legislative report, 92, 548; Comments on, 68.
Illinois Traction System (see Chicago, Ill.):
Indiana, Columbus & Eastern Traction Co. (see Springfield, Ohio):

Indianapolis, Ind.:
—Indianapolis Street Ry.:
Bus operation planned, 589.
Financial report, 930.
Labor case, Date set for arguments, 750.
Peoples Motor Coach Co. purchase negotiations, 752, 839, 927, 1014.
Wage increase, 260, 1013.
Wage increase for James Green, 1013.
—Interstate Public Service Co.:
Dining car menu praised, 457.
Interurban car order, 934.
Locomotive constructed out of bridge material [Bange], *649.
Personnel changes, 269, 400, 475.
—Terre Haute, Indianapolis & Eastern Traction Co.:
Bond exchange, 1062.
Discontinuance of weekly pass sought, 836.
Merger plans, 1062, 1156.

Indiana Service Corporation (see Fort Wayne, Ind.):

Indiana, State of:
—Bill against Commission defeated, 432.
—Bus operation by electric railways, 169.
—Farm demonstrations by interurban, 448.
—New utility laws, 711.
—Revenue from utility taxes, 412.

Industrial arts, Comments on, 805.
Inland Empire R.R. (see Spokane, Wash.):

Inspection of cars:
—Chicago, Ill., Methods, Details [Shaughnessy], *492; [Smith], *511.
—Freight, C.E.R.A. rules, *961.
—Harrisburg, Pa., Methods, *329.
—Philadelphia, Pa., Methods [Stier], c339.
—Winnipeg, Can., Methods [Watkins], 1105.
Insurance, Fire:
—A.E.R.A. collecting data, 216. Comments on, 153, 560.
—Underwriters' label on new cars, 291.
Insurance and pensions:
—Chicago, Ill., Employees insured, 1086.
—Group insurance, General Electric Co., 596.
—Quincy, Ill., Group insurance, 394.
—Rochester, N. Y., Insurance policies given for safety records, 181.
—Illinois Pwr. & Light give insurance policies to employees, 142.
Interborough Rapid Transit Co. (see New York City):

International Economic Conference:
—American ideas [Mehren], 1022.
—Capitalism and communism [Mehren], 982.
—Economic difficulties diagnosed [Mehren], 933.
—Economic remedies suggested [Mehren], 1068.
—Geneva meeting, Report, 676, 888.
—Pools and cartels summarized [Mehren], *1122.

International Ry. (see Buffalo, N. Y.):

Interstate Public Service Co. (see Indianapolis, Ind.):

Interurban railways:
—Grand Rapids, Mich., Suburban residents seek restoration of service, 217; Comments on, 191.
—Mexican Tramways interurban construction plans, 1022.
—Milwaukee, Wis., Interurban cut-off, etails.
—Motormen's badges poor ads for [An Interurban Patron], c422.
International Union of Tramways, Local Railways and Public Transport Automobiles:
—Rail corrugation study, Details [Ewing], 281.
Iowa, State of:
—One-man car decision, 585.
Italy:
—Transportation in Rome, Details [Blake], *945; [Raymur], c1145.

J

Jacksonville, Fla.:
—Jacksonville Traction Co.:
Property offered to city, 261.

Jamestown, N. Y.:
—Chautauqua Traction Co.:
Liquidation under way, 224.
—Disposition of railways discussed, 798.
—Jamestown Street Ry.:
Bus route to replace car service, 1061.
De luxe cars installed, Details, *994.
Motor rheostats on car roofs, *424.

Joliet, Ill.:
—Chicago & Joliet Electric Ry.:
Aluminum body for worm-drive truck, 1068.
Chicago-Central Illinois through service agreement, 625.
Taxi substitution for buses sought, 975.
Through limited service installed, 1012.
Worm-drive truck developed, 579; Details, *602, *954; Comments on, 561, 599.

K

Kansas City, Mo.:
—Kansas City, Lawrence & Topeka Electric R.R.:
Sale negotiations, 720.
—Kansas City Public Service Co.:
Car maintenance, Details [Neal], *689.
Fare changes sought, 786.
Franchise granted, Details, 584.
Franchise negotiations, 93, 180, 220, 392, 466, 712.
Power plant sold, 753.
Reconstruction program, Details, *113.
Sightseeing bus tours installed, 752.
Snow plow attachments, 824.
Track extensions, Citizens petition, 271.
—Viaduct construction plans, 221.
—Kansas City Railways:
Receiver discharged, 976.
Reorganization Committee reviews affairs, 632, 1156.

Kentucky Traction & Terminal Co. (see Lexington, Ky.):
Key System Transit Co. (see Oakland, Cal.):
Knoxville, Tenn.:
—Knoxville Power & Light Co.:
Fare arrangement popular, 355.
Track switch developed, Details, *485.

L

Lackawanna & Wyoming Valley R.R. (see Scranton, Pa.):

Lake Shore Electric Ry. (see Cleveland, Ohio):
Legal:
—Chicago, Ill., Home rule referendum, 549.
—Gasoline bill, Pennsylvania, 881.
—Legal notes, 63, 267, 437, 633, 843, 1018.

Legal (Continued):
—Louisville Ry. suit against bus competitor, 182, 262, 356.
—One-man cars upheld in Canada, 352; Comments on, 318.
—Operating contract between Boston companies, 307.
—Pasadena, Cal., Fare case lost in Supreme Court, 56.
—Pennsylvania, Daix traction bill, 882.
—Seattle, Wash., Suit to compel cash payment to employees, 218, 259.
—Seattle, Wash., Tax suits, Disqualification proceedings, 549.
Legislation for railways:
—Arkansas, Paving law upheld, 922.
—Governors address on, 391, 431, 467; Comments on, 365.
—Grand Rapids, Mich., Paving relief measure lost, 585.
—Illinois, Home rule bill discussed by Utilities Assn., 579.
—Indiana, New laws, 711.
—Legislative burdens discussed by New England Street Ry. Club, 622.
—Maine, Bus bill, 552.
—Minneapolis, Minn., Regulatory law, Repeal threatened, 430.
—Minnesota, Regulation of rates, 466; Comments on, 443.
—New Jersey paving relief bill, 305, 549, 586; Comments on, 599.
—New York, Legislative results, 354, 584, 666.
—Ontario, Canada, Sanitary legislation, 924.
—Paving relief progress, Comments on, 599, 805.
—Pennsylvania bus bill, 791.
—Philadelphia, Pa., Enabling legislation, 584, 665.
—Utah paving measures, 626.
Lehigh Valley R.R.:
—Gas-electric cars ordered, *102.
Lehigh Valley Transit Co. (see Allentown, Pa.):
Lemoyne, Pa.:
—Valley Railways:
Derrick for lifting motors and trucks, *88.
Levis, Quebec:
—Levis Tramways:
Holiday gifts to patrons, 141.

Lexington, Ky.:
—Kentucky Traction & Terminal Co.:
Air-magnetic brakes advertised, 990.
Trolley and bus operation, Details [Plimpton], *234.

Lights and lighting equipment:
—Chicago, Ill., Maintenance methods [Smith], *511.
—Floodlight projector (Westinghouse), *1007.
—Floodlighting projector, *133.
—Grand Rapids, Mich., Tail lights locked in place, *251.
—Headlight resistor, Oakland, Cal., *460.
—Lamp stands used in paint shop, *527.
—Milwaukee, Wis., Improved features, *327.
—Safety platform lighting methods [Miller], *642.
—Socket installation simplified, *826.
Lincoln, Neb.:
—Lincoln Traction Co.:
Bus substitution plans, 928.
—Omaha, Lincoln & Beatrice Ry.:
Bus abandonment sought, 1015.
Fares increased, 749, 837.
Loading platforms:
—Chicago, Ill., Concrete platform construction extended [Traiser], *816.
Locomotives, Electric:
—Canadian National Rys., Service record, Details, 606.
—Czechoslovakia, Details [Neithammer], *79.
—Great Northern Ry., 363.
—Indianapolis, Ind., Built from bridge material [Bange], *649.
—Inspection and testing, I.C.C. decision, 581.
—Orders during 1926, Statistics, *20; Comments on, 4.
—Paris-Orleans locomotive, Details, *458.
—Shipments made, 270, 1023.
—Simplon-Loetschberg, locomotive, *605.
—South Bend, Ind., Order for, 677.
—Storage-battery, Chicago & Northwestern Ry., Details, *83.
—Trolley storage—battery engines order, Highwood, Ill., *1023.

Locomotives, Oil-electric:
—Diesel prize announced, 596.
London, England (see Great Britain):
London, Ont., Can.:
—London Street Ry.:
Annual report, 1160.
Fare increase sought, 712.
Settlement sought with city, 973.
Long Island R.R. (see New York City):

Los Angeles, Cal.:
—Los Angeles Ry.:
Axle bearing flange, Fitting to truck, *343.
Banding wire machine, Details, *384.
Bus and truck repair shop, Design, *288.
Commutator slotter, Shop-built, Details, *577.
Compressor outfit on bus chassis, *424.
Electrically heated equipment for shop use, *705.
Fare controversy, 260, 432, 713, 925, 1153.
Grinding shoe heads, *659.
Handling armatures on monorail system, *897.
Hydraulic presses used in shops, Details, *824.
Merit system for employees, Results, *1139.
Motors rebuilt, Details, *614.
Municipal operation recommended, 877, 925, 1012; Comments on, 851.
Pick-up and delivery storeroom service, 88.
Report forms, Details, *76.

Los Angeles, Cal.:
—Los Angeles Ry. (Continued):
  Safety glass on grinder replaces goggles, *520.
  Sand drying plant, *211.
  Schedule making and checking methods, *997.
  Shops modernized, Details, *1045.
  Wheel flanges built up by welding, *869.
—Pacific Electric Ry.:
  Bus operations in Pasadena [Shoup], c821.
  De luxe bus service, 927.
  Fare increase negotiations, 56, 180, 548, 973.
  Interurban fare changes, 749.
  Personnel changes, 401.
  Street congestion increases repairs [Geibel], 781.
Louisville, Ky.:
—Jitney license ordinance planned, 928.
—Louisville Railway:
  Annual report, 630.
  Charter change to permit bus operation proposed, 752.
  Connelly Award for public service, 221.
  Injunction to restrain bus competitor, 182, 262, 356, 1155.
  Valuation figures, 1154.
Lubrication:
—Alemite, For brake hangers [Taurman], *914.
—Center bearing lubrication [Duffy], *1092.
—Bus lubrication methods [McDonald], 545.
—Crude oil production, 271.
—Oil reclaiming equipment, *212.
Lynchburg, Va.:
—Lynchburg Traction & Light Co.:
  Armature winding stand, *460.
  Lamp stands used in paint shop, *527.
  Pressing off pinions, *705.
  Wheel jack, Motor operated, *384.

M

Macon, Ga.:
—Macon Railway & Light Co.:
  Fare increase sought, 625.
  Rehabilitation proposed in survey, 432.
Maine, State of:
—New electric railway construction, Progress, 57, 142.
Maintenance practice:
—Annual cleaning, Comments on, 726.
—Car rider's viewpoint, Comments on, 479.
—Cast reduction, Comments on, 480.
—Costs increased by lack of cooperation, Comments on, 106.
—Electrical maintenance, Chicago, Ill., Details [Smith], *511; Comments on, 479.
—Exchanges of ideas promote progress, Comments on, 105.
—Good patterns reduce machining costs, Comments on, 893.
—Harrisburg, Pa., Improved methods, *329.
—Higher standards of maintenance reduce costs [Williams], *347.
—Keeping records, Comments on, 1073.
—Modern methods should be applied to [Rassell], 349.
—Noise reduced by proper maintenance, Comments on, 479.
—Overhauling practice, New Orleans, La. [Naquin], 256; Comments on, 319.
—Proper maintenance economical, Poem, 514.
—Pull-in record, Southern properties, 250, 342, 745, 871.
—"Pull-in" rules, Southern properties [McWhorter], c128; Comments on, 318.
—Service failures due to carelessness, Comments on, 365.
—Simplification of, Comments on, 1072.
—Street congestion increases repairs [Geibel], 781.
—Supervision of maintenance work, Comments on, 319.
—Use of another's idea of, Comments on, 1071.
Management:
—Confidence needed, Comments on, 1025.
—Employee interest necessary, Comments on, 1025.
—Unification of transit facilities, Comments on, 443.
Manhattan & Queens Traction Corp. (see New York City):
Marinette, Wis.:
 Menominee & Marinette Light & Traction Co.:
  Bus substitution sought, 629.
  Sun visor protects motorman from glare, *116.
Market conditions:
—American Brake Shoe report, 1926, 440.
—Bakelite traveling exhibition, 598.
—Brake block manufacturing organization, 403.
—Brill report, 363.
—Brown-Boveri elects new directorate, 188.
—Business forecasts of U. S. Chamber of Commerce, 873.
—Business outlook for 1927, 149.
—Bus tool manufacturer exhibit at A.E.R.A. convention urged, Comments on, 601.
—Cedar trade expected by new company, 148.
—Coal stocks nullify strike menace, 982.
—Crude oil production, 271.
—Electrical goods orders, 364.
—Electrical industry policy meeting, 596.
—Electric locomotive shipments, 270, 1023.
—Fake publicity warning to manufacturers, 559.
—Foreign trade convention, 597.
—General Electric orders, 1926, 228, 802.
—General Electric creates engineering council, 1022.
—General Electric report, 1926, 636.
Market conditions (Continued):
—General Electric, Reviews of 1926 activities, 66.
—German rail dumping case dropped, 1163.
—Globe Ticket Co. expansion, 1022.
—Haskelite products, Use by railways, 272.
—International Economic Conference at Geneva, 676, 888; [Mehren], 933, 982, 1022, 1068, *1122.
—International Steel Tie Co. orders for 1927, 149.
—Jobber's status discussed, 102.
—Lead production, 440.
—Lumber trade extension program, 188.
—Mack bus sales, 847, 983.
—Mazda lamps, Prices reduced, 637.
—Metal markets, Trend, 597, 637, 677, 723, 761, 800, 847, 889, 934, 984, 1024, 1069, 1124, 1166.
—Migrations and business cycles, *402.
—Outlook for 1927, Statistics, *47; Comments on, 67.
—Resale price enforcement defeated, 557.
—Rubber Exchange ruling, 103.
—St. Louis Car Co. steel erecting shop, *1165.
—Sales below cost to be investigated, 983.
—Simplified practices, Book on, 474; Comments on, 443.
—Steel castings, 762.
—Transformer prices reduced, 1022.
—Westinghouse achievements in 1926, 66.
—Westinghouse and subsidiaries merge, 103.
—Westinghouse orders, 230.
Market Street Ry. (see San Francisco, Cal.):
Maryland, State of:
—Public Service Commission seeks to increase powers, 141.
Massachusetts, State of:
—Motor vehicle law upheld in test case, 95.
Memphis, Tenn.:
—Memphis Street Ry.:
  Christmas gifts to employees, 91.
  Reconstructed cars, Details, *454.
  Stripes on drop platforms prevent accidents, 744.
Menominee & Marinette Light & Traction Co. (see Marinette, Wis.):
Merchandising transportation:
—Interurban stations affect, Comments on, 481.
—Modernization sells service [Gordon], 1087.
—Newark, N. J., Route numbers on cars, 491.
—Richmond, Va., Campaign, *140.
—Rome, Italy, Methods [Blake], *935.
—Saginaw, Mich., Campaign, *239.
Mexico:
—Mexican Ry. electrification progress, 440.
—Mexican Tramways:
  Interurban extensions planned, 1022.
Miami, Fla.:
—Jitneys eliminated by ordinance, 143, 183, Details, 1014.
—Miami Beach Ry.:
  Bus agreement, 1115.
Midwest Electric Railway Association:
—Annual meeting, Report, *1101.
—Meeting, Report, 90.
—Sectional meetings, Value of, Comments on, 151.
—Service improvement discussed, 135.
Milwaukee, Wis.:
—Milwaukee Electric Railway & Light Co.:
  Annual report, 358.
  Budget for 1927, 363.
  Car building program, 800.
  Crossing accidents reduced, 1046.
  Improvement plans for 1927, 315.
  Interurban cut-off construction, 219, 557; Details, *1985.
  New cars installed, Design, Details, *327.
  Safety crusade, 880.
  Service improvements, 1109.
  Substation equipment ordered, 846.
  Terminal in Watertown planned, 468.
  Track extension and reconstruction plans, 558.
  Wage agreement, 92, 262.
—Safety first booklet for children, 307.
Minneapolis, Minn.:
—Bus permits, Details, 396; 589.
—Minneapolis Street Ry.:
  Budget for 1927, 270.
  Improvement program, 55.
  Track improvement progress, 724.
—Railway regulation, Change threatened, 430.
—St. Paul City Ry.:
  Suggestions sought for increasing earnings, 184.
—Twin City Rapid Transit Co.:
  Annual report, 436; Comments on, 407.
  Bus encroachment protection, 928.
  Noiseless car construction, 103, 477.
  Taxicab purchase, Details, 95; Comments on, 69.
  Timekeeping simplified, Details, *241.
Minnesota, State of:
—Regulation of railway rates, 466; Comments on, 443.
—Bus regulatory bill, 143, 552, 669, 839.
—Fare and wage figures, 1915-25, 62.
Missouri:
—Liberty-Kansas City railway project, 393, 431.
—Rapid transit enabling act killed, 668, 750.
Missouri Pacific R.R.:
—Highway assessment reduced by court, 751.
Moffat tunnel, First section completed, *430.
Montreal, Can.:
—Montreal Tramways:
  Annual report, 977; Comments on, 938.
  Automatic rectifier substation installed, *766; Comments on, 764.
  Car order, 403.
  Emergency service motorized, 606.
  Rolling stock program for 1927, 363.
  Salvaging seat pedestals [Lindsay], *1005.
  Sand-spreading truck for bus routes [Lindsay], *688.
Montreal, Can:
—Montreal Tramways (Continued):
  Suburban station installed, Details, *944.
  Triplex car studied, 478.
Morris County Traction Co. (see Morristown, N. J.):
Morristown, N. J.:
—Morris County Traction Co.:
  Bus substitution plans, Details, 356; 628; Comments on, 319.
  Foreclosure sale, 631, 840, 1063.
Motor Bus, Design:
—Buffalo, N. Y., De Luxe buses, *1155.
—Bus drives, Comparison, 301.
—Improved chassis (Six-Wheel), *960.
—Lexington, Ky., Equipment [Plimpton], *234.
—Newark, N. J., 402; Details, *477.
—Oakland, Cal., Details [Harris], *607.
—Oil-electric bus developed by P.R.T., 669.
—Philadelphia, Pa., Order, Specifications, 678.
—Reo chassis, New, 888.
—Rome, Italy [Blake], *935.
—San Francisco Municipal Ry., *1135.
—Studebaker chassis design, *578.
—Timken-Detroit bus on tour, Design, *677.
—Twin-drive bus developed by Fageol, Details, *381.
Motor bus, Field for:
—Automotive Engineers discuss, 350.
—De luxe suburban service, Comments on, 365.
—Experience shows use for [Brosseau], 1149.
—Graham articles commended [Sawyer], c574; [Shoup], c821.
—Interurban service, Details [Graham], *413; Comments on, 406.
—Mass transportation, Use in [Richardson], [Schorn], c171.
—Place in urban transportation, Details [Graham], *371.
Motor bus, Gas-electric:
—Albany, N. Y., Operating details, *279.
—Detroit, Mich., Design, *188.
Motor bus, Installation:
—Annapolis, Md.—Washington, D. C., 308.
—Bellingham-Mt. Vernon, Wash., 356.
—Chicago Surface Lines, 1114.
—Grand Rapids—Grand Haven, Mich., 1114.
—High Point, N. C., 552, 928.
—Hudson, N. Y., 308.
—Milford, Conn., 222.
—Railway orders, 1926, Statistics, *33; Comments on, 3.
—Shawnee, Okla., 143.
—Southern Pacific Ry., 790.
Motor bus, Jitney competition:
—Columbia, S. C., 711.
—Louisville, Ky., Ordinance planned, 928.
—Miami, Fla., Elimination suggested, Details, 143, 183, 1014.
Motor bus, Practice:
—Albany, N. Y., Operating methods, *279.
—California Railroad Commission report, Details [McCabe], *866.
—Chattanooga, Tenn., Maintenance practice [Reed], *515.
—Cincinnati, Ohio, Operating plan, 470; Comments on, 445.
—Combination riveting and brake lining machine (Manley), 1100.
—Commercial car service magazine, 888.
—Davenport, Iowa, Operating details, 182.
—De luxe suburban service, Comments on, 365.
—Equipment for bus maintenance shown at Automobile Show, *212.
—Hinged gasket boards save space [O'Brien], *1096.
—Lexington, Ky., Coordinated bus operation, Details [Plimpton], *234.
—Magnets clear roads of nails, *826.
—Maintenance methods [McDonald], *545.
—Melbourne, Australia, Operating results, 858.
—Montreal, Sand truck for bus routes [Lindsay], *688.
—Newark, N. J., Bus operation changes, Details, *1039.
—Oakland, Cal., Coordinated operation, Details [Harris], *607.
—Operation by electric railways, 1926, Statistics, *33; Comments on, 3.
—Paris, France, Bus schedules, Details [Mariage], *157; Comments on, 152.
—Pittsburgh, Pa., De luxe bus operation [Noonan], *298.
—Regrinding brake drums [Copley], *1095.
—Repair equipment for:
  Air compressor equipment (U. S. Air Compressor), *707.
  Auto washer (Manley), *544.
  Car washing system (Curtis), *543.
  High-speed press (Weaver), *544.
  Hydraulic straightening press (Lourie), *544.
  Jack High-lift (Weaver), *543.
  Tire spreader (Weaver), *543.
  Truck ambulance (Weaver), *544.
  Universal motor stand (Manley), *543.
  Valve refacers (Van Normal), *1007.
  Venti-duct heater (Nichols-Lintern), *1049.
  Washing machine (U. S. Air Compressor), *544.
—Rome, Italy, Details [Blake], *935.
—San Francisco Municipal Ry., Feeder service, *1135.
—Windshields kept free from frost, Springfield, Ohio, *1145.
—Youngstown, Ohio, Operating details [Graham], *371, *413; Comments on, 406.
Motor bus, Regulation:
—American Automobile Association discuss, 1106.
—Connecticut, Interstate bus tax, 356.
—I.C.C. bus regulation report, 1114.
—Kentucky, Bus bill planned, Details, 59.
—Lansing, Mich., 716.
—Massachusetts law upheld in test case, 95.
—Missouri, Bus bill, 143, 552, 669, 839.
—Nebraska, Intertown buses, 975, 1115.
—New York City, Bus fare bill introduced, 308.

READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX
Abbreviations: *Illustrated. c Communications.

Motor bus regulation (Continued):
—New York Mayors Conference discuss, n13.
—Ohio, Supreme Court ruling on, 469.
—Pennsylvania, Interstate service ruling, 469.
—Philadelphia, Pa., Interstate bus taxes upheld, 790.
—Principles of [Brosseau], 1149.
—State laws upheld by U. S. Supreme Court, 143.
—Toledo, Ohio, Ordinance, 395.
—Wisconsin, Commission controls, 881.
Motors:
—Berlin, Germany, Motor equipment on cars, Details [Pforr], *243.
—British car motors for quiet operation, *817.
—Commutator assembling, Details [Zimmerman], *117, *323; Comments on, 317.
—Commutator maintenance, Preventing flashovers [Zimmerman], *489.
—Commutator turning and slotting, Details [Zimmerman], *694.
—Commutator V-bands, Protection for [Dean], 1006.
—Field coil winding diagrams, *703.
—Installation of motor fields, *131.
—Joliet, Ill., Mounting on worm-drive truck, *602; Comments on, 599.
—Maintaining gear-center distances [Pontius], *899, *1080; Comments on, 1071.
—Momentary stresses, Details [Aspinwall], *951.
—Reclaiming motor heads, *523.
—Reconditioning old motors, Los Angeles, Cal., *614.
—Repair department for, B.-M. T., *503.
—Repair equipment for:
  Commutator grooving machine [G. E.], *534.
  Field tester, *533.
  Forcing press (Lourie), *534.
  Mica undercutter (Hullhoost), *533.
  Pinion puller (G. E.), *533.
  Slot cleaning outfit (Martindale), *533.
—Replacing commutator bars [Zimmerman], c698.
—Rheostats installed on car roofs, Jamestown, N. Y., *424.
—Rotating frame facilitates repairs, *522.
—Sleeves for cable leads [Dean], *660.
Municipal ownership:
—Chicago, Ill., Plans for, 586.
—Coral Gables, Fla., Railway sold to city, 631.
—Experiences in, Results [Storrs], 828.
—Illinois, Utilities Association discuss, 579.
—Jacksonville, Fla., Property offered to city, 261.
—Los Angeles, Cal., Traction expert recommends, 877; Comments on, 871.
Municipal Railway of San Francisco (see San Francisco, Cal.):
Mystic, Conn.:
—Groton & Stonington Traction Co.:
  Reorganization, 265.

N

Nashville, Tenn.:
—Nashville Railway & Light Co.:
  Accident reduction compaign, Results, 862.
  Broadcasting safety and courtesy, 1154.
  Service maintained during flood, Methods, *651.
  Tract on courtesy issued, 789; Comments on, 763.
National Automobile Chamber of Commerce:
—World Motor Transport Congress meeting, Report, 176.
National Safety Council:
—Advantages of membership, Comments on, 939.
—1928 calendar announced, 666.
—New members, 1060.
Newark, N. J.:
—Parking banned in rush hours, 92.
—Public Service Corporation:
  Annual report, 1016.
  Budget for 1927, 307.
—Public Service Ry.:
  Bucket seats popular, Design, *170.
  Coordinated service increases revenue. Details, *1039.
  Fare controversy, 91, 394, 624.
  Morris Canal bed operation plans, 713, 974.
  New uniforms for employees, *1153.
  Personnel changes, *100, 721.
  Route numbers on cars, 491.
  Tracks to be laid over Camden Bridge, 551.
—Public Service Transportation Co.:
  Buses ordered, Design, Details, 402, *477.
  Bus shops proposed, 636.
  De luxe service to Hackensack, 396.
  New uniforms for employees, *1153.
  Personnel changes, *594.
New Bedford, Mass.:
—Union Street Ry.:
  Car rebuilt to resemble bus, *1138.
  Fare increase, 587.
  Forms printed on used register cards, 383.
  No-parking areas opposite track curves, *282.
New Brighton, Pa.:
—Beaver Valley Traction Co.:
  Improvement program, 715.
  One-man cars ordered, 1164.
  Pamphlet distributed on "low cost riding," 1154.
  "Thank you" bulletin, 626.
  Twenty-five-year employees honored, *465.
New Brunswick Power Co. (see St. John, N. B.):
New England Street Railway Club:
—Annual meeting, Report, 622.
—Bus drives compared, 301.
—Radio interference discussed, 920.
New Haven, Conn.:
—Connecticut Co.:
  Booklet tells railway facts, *1043.
New Haven, Conn.:
—Connecticut Co. (Continued):
  Building improvements in Waterbury, Details, *446.
  Car washing by pressure shower bath method, *990.
  Chart shows progress of paint shop work, *781.
  Guilford-New Haven bus service resumed, 396.
  Lineman rescued by fellow worker, 466.
  Mercury-arc rectifier order, 189.
  Motorman's stool chained to platform, *1084.
  Motor repairs, Rotating frame for, *522.
  Roll signs spray painted, *825.
  Tax suit decision, 714.
  Track reconstruction methods [Johnston], *691.
  Wage negotiations, 1154.
New Jersey, State of:
—Paving relief bill, 305, 549, 586; Comments on, 599.
New Orleans, La.:
—New Orleans Public Service, Inc.:
  Accidents reduced, 4-yr. record, 586.
  Car overhauling practice [Naquin], 256; Comments on, 319.
  First aid packet exhibit, *1040.
  Hinged gasket boards save space [O'Brien], *1096.
  Tool and truck maintenance parts board [O'Brien], *913.
Newport News & Hampton Railway, Gas & Electric Co. (see Hampton, Va.):
New York City:
—Brooklyn City R.R.:
  Accident prevention bonus system [Hodges], 215.
  Dividend omitted, 225, 840; Details, 882.
  Laundry drier for wet uniforms, *956.
—Brooklyn elevated removal deferred, 923.
—Brooklyn-Manhattan Transit Corp.:
  Adjustable tool for inaccessible faces, *1146.
  Armature testing, Details, *130.
  Brooklyn property owners demand trolley service, 751.
  Copper sleeve installation, *173.
  Duplex hollow mill, Details, *1047.
  Glimpses into new repair shop, *503.
  Jumper fuse location, 87.
  Magnet winding machine, *524.
  Personnel changes, 1120.
  Refunding bond issue sought, 882.
  Repair shop methods and tools, Details, *108; Comments on, 105.
  Shaping copper sleeves, Device for, *212.
  Syndicate takes bonds, 753.
  Tool holder for lathe, *959.
  Triplex cars, Equipping begun, 404.
  Wage increase, Details, 836.
—Brooklyn subway proposed, 626.
—Bus franchise negotiations, 58, 143, 183, 222, 308, 395, 928, 1062; Comments on, 405.
—Bus orders proposed, 66.
—Conference on steel cars called, 557.
—Eighth and Ninth Avenues Ry.:
  Railways consolidate, 60.
  Receiver appointed, 841.
—Electrification plans, 972.
—Fifth Avenue Coach Co.:
  Personnel changes, 64.
  Profit-sharing plan for employees, 629.
  Steam bus tested, 357.
—Interborough Rapid Transit Co.:
  Commutator slotting machine, *172.
  Dust-absorbing cabinet for armatures, *869.
  Hydraulic pinion puller, Home made, *131.
  New subway station opened, 714.
  Refuse containers made from grease drums, *293.
  Sling for moving armatures in shop, *251.
  Truck for handling car axles, *526.
  Wages increased, 625.
—Long Island R.R.:
  Double-track line opened, 104.
  New locomotives delivered, Details, *148.
  Steel cars ordered, 315.
—Manhattan & Queens Traction Corp.:
  Relocating tracks under way, 761.
—Nassau Street subway construction, 1012.
—New York Railways:
  Fibre washers on resistors, *521.
  Personnel changes, 64.
—New York & Stamford Ry.:
  Bus expansion plans, 1014.
—New York, Westchester & Boston Ry.:
  Bus service successful, 752.
  Extension contract, 921.
—Railroad and ferry passengers in 1926, 780.
—Staten Island transit situation [Reifschneider], c459.
—Steel car committee formed, 722.
—Subway building filmed, 411.
—Subway construction contracts, 1157.
—Subway construction, Mayor urges more money for, 429.
—Subway fire, *783.
—Subway measure passed by legislature, 584; Comments on, 232.
—Subway system survey to be made, 712.
—Subway tunnel contract let, 551.
  Housing type bearings for axles, *894; Comments on, 1071.
—Subways, Recapture discussed, 1111, 1152.
—Third Avenue Ry.:
  Accident prevention work [Segard], 216.
  Bus substitution in Tarrytown discussed, 716.
  Car cleaning, Details [McWhirter], *482.
—Berkshire Street Ry. bonds purchased, 1062.
—Traffic congestion [Langan], c86.
—Traffic lane capacity, 237.
—Traction problems, Negotiations, 179, 878, 971; Comments on, 3.
—Warning signs to motorists, Brooklyn, *429.
New York Electric Railway Association:
—Annual meeting, Running report, 214.
—Midwinter meeting, Program, 136.
New York, New Haven & Hartford R.R.:
—Acquisition of Springfield and Worcester, Mass., railways, Progress, 145, 225, 359, 553.
—Berkshire Street Ry. bonds purchased, 1062, 1118.
—Bus substitutions sought in Westchester, 629.
—Danbury-Hartford bus permit revoked, 433.
New York Railways (see New York City).
New York, State of:
—Mayors conference discuss transportation problem, 1113.
—Public Service Commission reorganization progress, 305.
—Railway tax situation discussed by Mr. Merrill, 260; Comments on, 233.
—Traffic signal standardization recommended, Details, *940; Comments on, 938.
—Transit bills introduced, 354, 666.
—Utility taxation methods [Seligman], 199.
New York State Rys. (see Rochester, N. Y.).
New York, Westchester & Boston Ry. (see New York City).
Noise reduction:
—British car designed for quiet operation, Details, *817.
—Car glass set in rubber tubing [Harris], *1095.
—Proper maintenance aids, Comments on, 479.
—Worm-drive car tests for noise, Springfield, Mass., *859.
—Worm-drive truck, Joliet, Ill., Details, *602; Comments on, 599.
Norfolk, Va.:
—Norfolk Railway & Light Co.:
  Purchase by Richmond company arranged, 435.
North Carolina Public Service Co. (see Greensboro, N. C.).
North Jersey Transit Commission:
—Interstate rapid transit loop, Report, Details, *333.
—Tunnel extension advantages urged, 1012.
Northern Ohio Power Co. (see Canton, Ohio).
Northern Ohio Power & Light Co. (see Akron, Ohio).
Northern Texas Traction Co. (see Fort Worth, Texas).

O

Oakland, Cal.:
—Key System Transit Co.:
  Bus and car co-ordinated operation, Details [Harris], *607.
  Change in control impends, 787.
  Double catenary suspension, *344.
  Electric track switch for joint operation, Details, *1037.
  Fare controversy, 921.
  Ferryboats leased, 822.
  Headlight resistor, *460.
  Personnel changes, 979, 1066.
  Power take-off for portable track tools, *523.
  Safety signal improvement, 983.
  Valuation survey to be made, 353.
—Railway issue in mayoralty election, 714.
Oak Park, Ill.:
—Chicago & West Towns Ry.:
  Income since 1920, Details, 472.
Ogden, Utah:
—Utah-Idaho Central R.R.:
  Bus certificate granted, 1062.
Ohio, State of:
—Electric railway improvement plans, 440.
Ohio Valley Electric Ry. (see Huntington, W. Va.).
Oil industry explained, Comments on, 1125.
Oklahoma City, Okla.:
—Oklahoma Railway:
  Anniversary celebration, 421.
  Financial report, 224.
  Receivership may end soon, 266.
Omaha, Lincoln & Beatrice Ry. (see Lincoln, Neb.).
Omaha, Neb.:
—Omaha & Council Bluffs Street Ry.:
  Bond extension, 1117.
  Franchise negotiations, 56, 428, 468, 750, 1060, 1154.
  Trackwork planned for 1927, 363.
Operating records and costs:
—Fitchburg, Mass., Analysis of [Baker], *738.
—Glasgow, Scotland, Single-deck car revenue, *566.
—Harrisburg, Pa., Maintenance costs reduced, *329.
—Holland, Railway, trackless trolley and bus costs compared, *612.
—Locomotive's service record, Canadian National Rys., 606.
—Maintenance-cost reduction, Comments on, 480.
—San Francisco, Cal., Bus line operations, *1135.
—Simplification as a means of reducing costs, Comments on, 1072.
—Steel and aluminum car data, Comparison, *655; Comments on, 639.
—Youngstown, Ohio, Bus and railway operation compared [Graham], *371.
Ottawa, Ont., Can.:
—Ottawa Electric Ry.:
  Annual report, 670.
  Gray line Association invites membership, 182.
  Sightseeing service begun, 839.
Overhead contact system:
—Alloy trolley wires [Neild], 1052, 1107.
—Chicago, Ill., Construction and maintenance methods [Smith], *511, *682.
—Cradle for lifting poles, *1148.
—Double catenary suspension, Oakland, Cal., *344.

Overhead contact system (Continued):
—Dynamometers regulate trolley wire tension. 488.
—Inspection method. Cleveland. Ohio [Scott]. *896.
—Insulator improvements. Canadian National Rys., 606.
—Maintenance methods. Ill. Traction. *379.
—Oakland. Cal., Pantograph contactor on joint track. *1037.
—Pole setting methods. Cleveland. Ohio. *958.
—Trolley frog (Westinghouse). *1148.

P

Pacific Electric Ry. (see Los Angeles. Cal.).
Pacific Gas & Electric Co. (see Sacramento, Cal.).
Pacific Northwest Traction Co. (see Seattle. Wash.).
Painting:
—Buffalo. N. Y.. Cars repainted, 908.
—Car painting. Baltimore. Md.. Methods [Clark]. 498.
—Car painting in Berlin. 528.
—Car roofs. Southern properties. 693.
—Kansas City. Mo., Repainting cars. Methods [Neal]. *689.
—Lynchburg. Va.. Lamp stands used in paint shop. *527.
—New Haven. Conn.. Chart shows progress of work. *781.
—Nitrocellulose laquer development. Comments on. 891.
—Paint seals joints (G. E.). 616.
—Paint shop for trolleys and buses. Lexington. Ky. [Plimpton]. *234.
—Paint spraying gun (Alexander Milburn). *915.
—Repainting cars. Comments on. 481.
—Spray:
  Akron. Ohio. Methods [See]. *1041.
  Car painting exhaust system. *173.
  Roll signs. New Haven, Conn.. *825.
  Equipment for (U. S. Air). *529.
Paris. France (see France).
Parking of cars:
—Chicago. Counsel opinion on. 666.
—Chicago. Ill.. Traffic survey report. *70; Comments on. 69. 107.
—Curbstone parking. Survey of 17 cities. 124.
—Department store men warned against. 1153.
—Elimination benefits majority [Miller]. 256.
—Grand Rapids. Mich.. Downtown parking. Elimination suggested. 776.
—Highwood. Ill.. Railway furnishes free parking space. 430.
—Narrow car line streets. Parking on [Traiser]. *1128.
—New Bedford. Mass.. No-parking opposite track curves. *282.
—Philadelphia. Pa.. Parking ordinance. 93. 179. 352. 624: Comments on. 153. 559. 560. 804.
—Newark. N. J.. Parking banned in rush hours. 92.
Pavements:
—Cement. Quick-setting. France. Details. *386.
—Chicago. Ill.. Paving case decision favors city. 142.
—Damage caused by trucks. Comments on. 891.
—Discussed by New York Mayors. 1113.
—Erie. Pa.. Paving methods. *331.
—New Haven. Conn.. Details [Johnston]. *691.
—Paving brick. Adopted and eliminated varities. 888 *1164.
Pennsylvania Railroad:
—Newark. N. J.. Improvement plans. 971.
—Power plant construction plans. 353.
—Suburban electrification at Philadelphia. 925.
—Switching equipment order. 1163.
Pennsylvania-Ohio Electric Co. (see Youngstown. Ohio).
Pennsylvania. State of:
—Bus bill signed. 791.
—Daix traction law. 882.
—Gas bill signed. 881.
—Interstate bus service ruling. 469.
Philadelphia. Pa.:
—Fairmount Park Transit Co.:
  Capital structure changes planned. 266.
—Interstate bus tax upheld. 790.
—Ordinances authorizes track changes and bus franchise. 585.
—Parking ordinance. 93. 179. 352. 624; Comments on. 153. 559. 560. 804.
—Philadelphia Rapid Transit Co.:
  Accident reduction campaign. *626.
  Air mail contract revoked. 432.
  Bridge bus tolls increased. 975.
  Bus order. 270. Details. 678.
  Bus exhibit at home-building show. *650.
  Commission rulings on transit changes. 625.
  Committee personnel changes. 548.
  Employee ownership statement. 61.
  Enabling legislation. 584. 665.
  Equipment trust certificates issued. 265.
  Financial report. 590. 930.
  Frankford lease controversy. 304. 713.
  House organ for employees. 466.
  Inspection methods [Stier]. c339.
  Musicial comedy presented by employees. 1059.
  New offices. Details. 668. 1013. 1112.
  Removing broken cap screws [Gilbert]. *911.
  Safety campaign. Details. *806; Comments on. 803.
  Service survey started. 178.
  Service to Camden planned. 751.
  Transportation evolution exhibit. *1079.
—Philadelphia Rural Transit Co.:
  Oil-electric bus developed. 669.
—Subway car construction. Progress. 557.
—Subway construction bids. 1111.
—Subway signal contract. 1123.
—Traffic survey. Report. 93. 584. 749.
Phoenix, Ariz.:
—Phoenix Street Ry.:
  Bond issue approved by voters, 352. 550. 837.
Piedmont & Northern Ry. (see Charlotte, N. C.).
Pittsburgh, Pa.:
—Pittsburgh Railways:
  Automatic car washing. Details, *451.
  Babbitt department equipment. *491.
  Department store ad features service. *354.
  Fare decrease on short line. 93.
  De luxe bus operation. Details [Noonan]. *298.
  Development of miscellaneous revenue [Boyce]. 1055; Comments on. 1073.
  Elephants hailed downtown. *1112.
  Former employees entertained. *306.
  Popularizing service, Methods [Donley]. 175.
  Publicity week, Details, *194; Comments on. 191.
  Red cross drive. *925.
  Track construction and maintenance methods [Williams]. *495.
  Wage increase commented on by newspaper. 141.
  Woman gives service suggestions. 220.
—West Penn Rys.:
  Annual report, 632.
  De luxe car for limited service, Design. Details, *1036.
  Terminal improvements, Details, *1001.
Pittsfield, Mass.:
—Berkshire Street Ry.:
  Bonds extended. 1062, 1118.
  New cars installed. Specifications. *722.
Pleasantville. N. J.:
—Atlantic & Suburban Ry.:
  Old rattan seats stained. 577.
Poles:
—Preservative treatment [Boehne]. *1103.
Portland. Me.:
—Cumberland County Power & Light Co.:
  Dolly truck for crippled cars [Chiles]. *914.
  Repairing steel side sheets of cars [Chiles]. *1093.
Portland. Ore.:
—Portland Electric Power Co.:
  Department store gives free rides. 878.
Porto Rico.:
—Porto Rico Railway, Light & Power Co.:
  Cars ordered, Specifications. *761.
  Financing of purchase arranged. 435.
  Wheel fenders protect trucks. *322.
Portsmouth, Ohio:
—Portsmouth Public Service Co.:
  Co-ordinated car and bus service, Details, *1133.
Poughkeepsie. N. Y.:
—Poughkeepsie & Wappinger falls Ry.:
  No-accident contest. 922.
Power distribution:
—Economics of [Westman]. 1054.
—Maintenance of electrical system. Comments on. 479.
—Montreal. Can.. Details. *766: Comments on. 764.
—Recording instruments. 134.
—Supervisory control system. Chicago Surface Lines. Details [Noah]. *863.
Power generation:
—Detroit United equipment sold. 311.
—Fitchburg. Mass.. Rotary converters installed [Baker]. *738.
Power transmission:
—Bow collector. Automatic reversing. Toronto. Can.. *421.
Prescott. Dick. *132. *342. *702. *917. *1100.
Providence. R. I.:
—Subway plan suggested. 304.
—Transit board proposed. Details. 1012.
—United Electric Rys.:
  Metcalf trophy contest entered. 880.
  Personnel changes. 885.
  Radio interference analyzed [Thompson]. 967; Comments on. 985.
  Rolling stock improvement. Details [Dickson]. *988.
  Truck breakage reduced [Clarkson]. *1091.
Psychological tests for workers urged by Dr. Gilbreth. 595.
Publicity:
—Allentown. Pa., Bus schedule cards distributed. 628.
—Atlanta. Ga.. Campaign. Details. *1032.
—Boston. Mass.. Railway guide book issued. *165.
—Cincinnati. Ohio. New cars celebrated. 1151; Comments on. 1127.
—Davenport. Iowa. Radio talk on service. 453.
—El Paso. Texas. Publicity program. Details [Muse]. *163; Comments on. 192.
—Fort Wayne. Ind.. Plant exhibited to the public. *305.
—Grand Rapids. Mich.. Campaign for paving referendum. 627.
—Indianapolis. Ind. .Dining car menu praised by newspaper. 457.
—New Brighton. Pa.. "Low cost riding" pamphlet. 1154.
—New Haven. Conn.. Booklet gives railway facts. *1043.
—Newspaper comment valuable to railways. Comments on. 560.
—New York City subway building filmed. 411.
—P. R R.. Modern equipment described in pamphlet. 248.
—Philadelphia. Pa.. Bus exhibit:
  Home-building show. *650.
  Safety campaign publicity. *806; Comments on. 803.
  Transportation evolution exhibit. *1079.
—Pittsburgh. Pa.. "Ride the trolley week." Details. *194; Comments on. 191.
—Pittsburgh Ry. service featured in store ad. *354.
Publicity (Continued):
—St. Louis. Mo., Pamphlet tells operating details. 171.
—San Antonio. Texas. Alarm clocks show bus schedules. *1144.
—Williamsport. Pa., New buildings inspected by public. 429.
Public. Relations with:
—Aid to motorist fosters. Comments on. 727.
—Buenos Aires. Comments on. 367.
—Buffalo. N. Y.. Art poster contest for students. 586.
—Car appearance affects [McAloney]. c459.
—Car cleanliness affects [Potter]. c289.
—Chicago. Ill.. Service during holidays. *10.
—Cincinnati. Ohio. Social agencies get free ads in cars. 666.
—Claim department's attitude affects. Comments on. 600.
—Clean. bright cars affect [McMahon]. c575.
—Cleveland. Ohio. "Dress-up Day" for employees. *820.
—Commercial department would improve [Graham]. 125; Comments on. 192.
—Community interests needed to help transportation. 138.
—Community welfare demands transit improvement [Sawyer]. 830.
—Contest for railway emblem. Cincinnati. Ohio. 56.
—Courtesy of employees. Comments on. 274. 367.
—Dallas. Texas. Customer ownership. 266; Results [Meriwether]. *777.
—Detroit. Mich.. Identification numbers for employees. 926.
—Denver. Colo.. Prizes offered for slogans. 393.
—Employee training affects. [Sarre]. 831.
—Gary. Ind.. Customer-ownership campaign. 357.
—Good equipment improves [Holtzclaw]. 833.
—Grand Rapids. Mich.. New Year's car receives favorable comment. *180.
—Levis. Que.. Holiday gifts to patrons. 141.
—Local transit problems better understood by public [Storrs]. 828.
—Maintaining rights. Comments on. 987.
—Modern cars improve [Chiles]. [Bucher]. [Hearn]. c249; [Colby]. c289; Comments on. 231.
—Modern rolling stock attracts patrons [Potter]. c423.
—Nashville. Tenn.. Booklet issued. 789; Comments on. 763.
—Nashville. Tenn.. Service during flood. *651.
—New Brighton. Pa.. "Thank you" bulletin. 626.
—Passenger's claims [Boyce]. 1055; Comments on. 1073.
—Personnel contact. Comments on. 406.
—Pittsburgh. Pa.:
  Business men aid publicity campaign. *194; Comments on. 191.
  Service popularized [Donley]. 175.
  Store ad features railway service. *354.
  Woman advises ways to improve. 220.
—Politician cooperation. Comments on. 805.
—Portland. Ore.. Department store gives free rides. 878.
—Saginaw. Mich.. Publicity campaign improves. *239.
—Seattle. Wash.. Clubs aid in traffic stimulation. 355.
—Speedy and attractive cars improve [Myers]. c289.
—Spokane. Wash.. Business institutions pay customers' fares. 431.
—Standing passengers. Comments on. 274.
—Tacoma. Wash.. Citizens interviewed on service. 392.
—Talking trainmen can harm. Comments on. 233.
—Wheeling. W. Va.. Merchants purchased railway service on Community Day. 56.
—Winnipeg. Can.. Customer-ownership campaign. 97.
Public service and regulative commissions:
—California R.R. Commission reorganizes. 186.
—California rate cases. 971.
—Fare hearings. Comments on. 939.
—Interstate Commerce Commission:
  Bus regulation report. 1114.
  Depreciation case. 264. 351. 883; Comments on. 892.
  Decision on inspection and testing electric locomotives. 581.
  Ruling on St. Louis & O'Fallon R.R. valuation case. Comments on. 640.
  Truck competition hearings. 589.
—Indiana Commission attacked. 305. 432.
—Indiana commission personnel. 886.
—Maryland Commission would increase powers. 141.
—Minneapolis railway regulatory law. Repeal threatened. 430.
—New York Commission not bound by franchises. 141.
—New York. Commission reorganization progress. 305.
—Ohio Commission personnel. 885.
Public Service Corporation (see Newark. N. J.).
Public Service Ry. (see Newark. N. J.).
Public Service Transportation Co. (see Newark. N. J.).

R

Radio:
—Davenport. Iowa. Transport problems broadcast. 453.
—Fort Worth. Tex.. Used as advertising medium. 242.
—Nashville. Tenn.. Safety and courtesy broadcasting. 1154.
—Railway broadcasting limitations suggested. 1012.

Radio (Continued):
—Reduction of interference, Concord, Mass. [Crawford], 969.
—Causes of interference analyzed [Thompson], 967; Comments on, 985.
—Sources of interference [Bickford], 968.
Rail joints and bonds:
—Base plate joint developed, Boston, Mass. [Walker], *773.
—Joints welded with small plates, *133.
Rails:
—Corrugation, Effect of abrasion and compression, Details [Fremont], *283.
—Corrugation study made in Europe [Ewing], 281.
—Tee rail construction, Atlantic City, N. J. [Ashbridge], *1074.
Railways:
—Brady safety award continued, 587.
—Community upbuilding of interest to [Sawyer], 276.
—Developments in 1926, 5; Comments on, 2.
—Future planning, Comments on, 804.
—Hysteresis of railways, Comments on, 273.
—Manufacturer and operator have common interest in [Sawyer], *123; Comments on, 151.
—Modernization pays [Sawyer], 276.
—Newspaper comment valuable to, Comments on, 560.
—Operations in 1926, A.E.R.A. report, 792; Comments on, 764.
—Progress and needs outlined [Storrs], 828.
—Railway situation improving [Storrs], *449; Comments on, 445.
—Review of events, 1926 [MacMurray], *13; Comments on, 105.
—Traffic congestion can be reduced by [Traiser], *1128.
—Trust company calls railways major method of transportation, 586.
—Year's progress, Comments on, 1.
Rapid transit:
—Chicago subway plans, Details, *154; 429; Comments on, 152.
—Detroit, Mich., Report on, 91, 587.
—German rapid transit railway, Construction progress [Cauer], *1131.
—New Jersey-New York transit loop, Report, *333.
—New York City, Subway construction contract, 1158.
—New York City subway measure 429, 584.
—Providence, R. I., Subway plan, 304.
—St. Louis, Mo., Enabling act killed, 668.
Reading, Pa.:
—Reading Transit Co.:
  Rags and waste reclaimed for shop use, *172.
  Wood bending, *704.
Repair shop equipment, New:
—Air compressor, Belt-driven (Sullivan), *917.
—Armature baking oven (Westinghouse), *534
—Armature buggy (Columbia), *534.
—Armature testing set, *1098.
—Armature stands, Adjustable (Columbia), *534.
—Armature testing equipment (Westinghouse), *708.
—Armor plate universal iron workers (Buffalo Forge), *538.
—Auto arc (Westinghouse), *530.
—Axle lathe (Putnam), *532; (Niles), *1098.
—Babbitt melting pot (G.E.), *535.
—Banding, slotting and turning machine (Lee Courtenay), *535.
—Band saw (Oliver), *540.
—Band saw filing and setting machine (Wardwell), *538.
—Blacksmith forge (Buffalo Forge), *539.
—Blower, Silent (Buffalo Forge), *708.
—Boring and turning machine (Gisholt), *537; (Niles), *1099.
—Boring mill, Side-head (Niles), *531.
—Brush-holder mechanism (Westinghouse), *1100.
—Car hoists, Portable (Whiting), *530.
—Chisel mortiser (Oliver), *539.
—Circular relief grinder (Cleveland Tool), *538.
—Cold saw cutting-off machine (Espen-Lucas), *535.
—Combination grinding and buffing machines (Hisey-Wolf), *826.
—Combination journal turning and axle lathe [Niles], *1099.
—Cutting and welding equipment (A. Milburn), *529.
—Die sinker and milling machine (Reed-Prentice), *537.
—Drill and tapper, Ball bearing (Barnes), *535.
—Drill, Electric, Ball bearing, *345.
—Drilling machine, Electric (Standard), *709.
—Drill press (Barnes), *708.
—Electric hoist, Flexible mounting (American), *745.
—Engine lathe, Geared heads (Manning), *917.
—Filing and beveling machine for circular saws (Wardwell), *916.
—Forcing press (Manley), *535.
—Grinding machines, Motor driven, *133.
—Hand plane, Electric (Wappat), *540.
—Hand saw, Portable (Ingersoll-Rand), *616.
—Home-made tools, Comments on, 679.
—Jacks (Oil Jack), *530.
—Journal burnishing lathe (Putnam), *532.
—Lathe, 16-inch (Pratt & Whitney), *1098.
—Lathe, Standard cone head (Reed-Prentice), *915.
—Lathe, Standard geared head (Reed-Prentice), *709.
—Milling machine (Artisan), *783.
—Oxygraph (Air Reduction), *916.
—Pattern lathe (Oliver), *539.
—Pedestal grinders (Standard), *536.
—Pipe-bending machine (American), *529.
—Pipe machine (Bignall & Keeler), *530. *1099.
Repair shop equipment, New (Continued):
—Pipe-threading and cutting machine (Saunders), *536.
—Pipe wrench (Lawson), *529.
—Planer (Niles), *916.
—Planer, Second-belt drive (Reed-Prentice), *707.
—Power bench drill (Buffalo Forge), *1099.
—Power drill (Buffalo Forge), *537.
—Power ring and circular shear (Peck, Stow & Wilcox), *538.
—Power squaring shears (Peck, Stow & Wilcox, *707.
—Punching and shearing machine (Long & Allstatter), *539.
—Rivet Forge (Buffalo Forge), *539.
—Saw bench (Oliver), *540.
—Saw, Portable chain, 294.
—Siding head drills (Niles), *915.
—Shoe brake for crane and hoist motors, 661.
—Socket wrenches in case (Bonney), *826.
—Test rack for air equipment [Reddersen], *338.
—Torch, Oxy-illuminating gas, *251.
—Turning, wiring and burring machine (Peck, Stow & Wilcox), *538.
—Turret lathe (Gisholt), *536.
—Under-cutter (Martingale), *915.
—Welder, Gas-engine-driven (G.E.), *616.
—Welding electrode (G.E.), 578.
—Wheel borer (Niles), *532.
—Wheel boring machine (Putnam), *532.
—Wheel lathe (Niles), *916.
—Wheel lathe (Putnam), *533.
—Wheel press (Niles), (Lourie), *531.
—Woodworking machine (Buffalo Forge), *540.
—Wrench kit (Bonney), *661.
—Wrenches (Bonney), *529.
—Wrenches, Chrome vanadium steel, *294.
Repair shop practice (Cars and car equipment):
—Adjustable tool for inaccessible faces, B.-M. T., *1146.
—Aluminum covering for stanchions [Williams], *615.
—Armatures:
  Baking-oven asbestos-incased, *211.
  Bar-to-bar testing, B.-M.T., *130.
  Bearing press operation, *615.
  B.-M.T., Methods used, Details, *108, Comments on, 105.
  Boring bearings after housing installation [Duffy], *1092.
  Coil insulation removed by lye, *522.
  Core nuts made from pinion, *706.
  Triple baking prolongs life, 1047.
  Winding diagram, *704.
  Winding stand, Lynchburg, Va., *460.
  Winding truck, Portable, *521.
—Bearing flanges reclaimed with cast-iron rings, *519.
—Boston, Mass., Shop methods [Bolt], *207.
—Car glass set in rubber tubing [Harris], *1095.
—Car maintenance judged by failures [McMahon], c698.
—Carrier for removing broom motors [Blaiklock], *1093.
—Car wheel buggy for shop use, *525.
—Commutator for spacing attachment [Herms], *1091.
—Contact fingers refinished in lathe, *520.
—Defective cars, Comments on, 679.
—Derrick for lifting motors and trucks, *88.
—Electrically heated equipment for shop use, *705.
—Electric hoist made from air compressor, *10941.
—Hydraulic bearing press, Atlanta, Ga., *912.
—Illinois Traction car maintenance [Barnhart], 617.
—Kansas City, Mo., Overhauling methods [Neal], *689.
—Lumber handling, Stand for, *703.
—Magnet winding machine, B.-M.T., *524.
—Motor field installation, Details, *131.
—Parowax method for determining flange wear [Blaiklock], *913.
—Pinions, Pressing off, *705.
—Pinions removed by hydraulic puller, *131.
—Preventive maintenance, Comments on, 480.
—Removing broken cap screws [Gilbert], *911.
—Resistors, Fibre washers increase creepage distance, *521.
—Safety glass on grinder replaces goggles, *520.
—Salvaging seat pedestals [Lindsay], *1005.
—Sawing machine, Washington, D. C., *461.
—Steel side sheets, Repairing [Chiles], *1093.
—Support for car body, St. John, N. B., *1047.
—Switch groups, Improved wiring for, 386.
—Temporary repairs, Comments on, 680.
—Tool and truck maintenance parts board [O'Brien], *913.
—Transporting car trucks with broken axles, *426.
—Trolley base (G. E.), *294.
—Wood bending, Reading, Pa., *704.
Repair shop practice (Shops and shop equipment):
—Armatures:
  Dust-absorbing cabinet for, *869.
  Handling on monorail system, Los Angeles, *897.
  Sling for lifting and carrying, *251.
  Truck for handling, *744.
—Axle collar increases life of bearings, *292.
—Babbitting bearings, 659.
—Babbitting, Pittsburgh, Pa., *491.
—Banding wire machine, Details, *384.
—B.-M.T., Methods, Details, *108; Comments on, 105.
—Carpenter shop waste disposal plant, Richmond, Va., *1144.
—Cleaning tank for rags and waste, *172.
—Commutator slotter, Shop-built, *577.
—Commutator slotting machine, *172.
—Copper sleeve installation, *173.
—Copper sleeves, Device for shaping, *212.
—Commutator slotter on lathe stand, *87.
Repair shop practice (Shop and shop equipment) (Continued):
—Commutators, Methods and equipment for assembling, Details [Zimmerman], *117, *323; Comments on, 317.
—Duplex hollow mill, B.-M.T., Details, *1047.
—Grinding shoe heads, *659.
—Hydraulic presses, Los Angeles, Cal., *824.
—Knowledge of improved methods needed, Comments on, 106.
—Oxyacetylene torch, Uses of [Foote], *576.
—Pick-up and delivery storeroom service, 88.
—Portable lathe for small work, *172.
—Refuse container made from grease drums, *293.
—Saw belt driven by air compressor motor, *342.
—Tempering and resetting springs [Kyle], *576.
—Tool holder for lathe, *959.
—Wheel jack, Motor operated, *384.
—Workbenches improve working conditions, *293.
Repair shops and equipment:
—Atlanta, Ga., Creosoting plant [Smith], *455; Comments on, 444.
—B.-M.T., Equipment, Details, *108; Comments on, 105.
—B.-M.T., New shop and equipment, Glimpses of, *503.
—Chicago Rapid Transit Co., new shops, *802.
—Chicago, Ill., Shop construction progress, 502.
—Cincinnati, Ohio, Shop construction begun, 846.
—Labor saving machinery necessary [Rossell], 349.
—Los Angeles, Cal., Bus and truck repair shop, Design, *288.
—Los Angeles Ry., Shops modernized, Details, *1045.
—Pittsburgh, Pa., Car cleaning equipment, Details, *451.
—Poor tools cause accidents, 502.
—Richmond, Va., Carpenter shop waste disposal plant, *1144.
—Sand drying plant, Los Angeles, Cal., *211.
—Tools for assembling commutators [Zimmerman], *117, *323; Comments on, 317.
—Waterbury, Conn., Details, *446.
Reports, Financial (see Financial reports).
Richey's conspectus of indexes, 185, 398, 592, 754, 978, 1158.
Richmond, Va.:
—Virginia Electric & Power Co.:
  Axle storage, *525.
  Baking oven for armatures, *211.
  Car modernization program, 1165.
  Carpenter shop waste disposal plant, *1144.
  Cars ordered, Details, *801.
  Fares increased in Petersburg and Norfolk, 56.
  Franchise changed, 431.
  Light bar steel storage, *343.
  Lumber handling, Stand for, *703.
  Merchandising transportation, Campaign, *140.
  Parade of new cars, 596.
  Personnel changes, 721.
  Polishing bearing surfaces of axles, *526.
  Purchase of Norfolk property arranged, 435.
  Sand storage bins, *293.
  Simplified weekly pass in Norfolk, *815.
  Track extension work, 890.
  Transporting car trucks with broken axles, *426.
  Wages increased, 141.
Rochester, N. Y.:
—Canal railroad operation discussed, 550.
—Erie Canal railway to use lift rule of road, 198.
—New York State Rys.:
  Annual report, 60.
  Fare hearing, 91.
  Fares increased in Rome, N. Y., 180.
  Insurance policies given for safety records, 181.
  Oneida fares increased, 667.
  Purchases made and taxes paid in 1926, 772.
  Service-at-cost franchise asked for buses, 183.
  Service records, 995.
  Subway contract, 924.
  Syracuse fare controversy, 260, 303, 393, 627; Comments on, 273.
  Syracuse revenue passengers in 1926, 310.
  Tempering and resetting springs [Kyle], *576.
  Uniform traffic signs committee appointed, 779.
  Valuation controversy, 711.
  Wage negotiations, 549, 668, 837, 922, 972, 1059.
Rochester & Syracuse R.R. (see Syracuse, N. Y.).
Rockford, Ill.:
—Railways reorganized, 314, 798.
—Rockford & Interurban Ry.:
  Cars ordered, 270, 363.
—Rockford Public Service Co.:
  Garage construction plans, 1166.
  New franchise adopted, 220.
  Personnel changes, 360.
Rock Island, Ill.:
—Tri-City Railway of Illinois:
  Personnel changes, 147.

S

Sacramento, Cal.:
—Pacific Gas & Electric Co.:
  Fare increase sought, 923.
Safety work:
—Atlanta, Ga., Cody Safety Medal, 1060.
—Brady safety award, 587, 664; Comments on, 640.

Safety work (Continued):
—Britton I. Budd medal for saving lives awarded, 923.
—Brooklyn cars bear warning sign to motorists, 429.
—Chicago, Ill., Rubber markers for safety islands, 1039.
—Discussed by Kentucky Public Utilities Assn., 387.
—First aid training school, Chicago, Ill., 857.
—Hazleton, Pa., Safety guards on shop machinery, *906.
—Insurance policies given for safety records, 181.
—Milwaukee, Wis., Booklet for children, 307.
—Milwaukee, Wis., Safety crusade, 880.
—New Orleans, La., First aid packet, *1040.
—Personnel cooperation necessary, Comments on, 561.
—Philadelphia, Pa., "Will Livelong" campaign, Details, *806; Comments on, 803.
—Progress of safety movement, Comments on, 599.
—Safety course for employees, Chattanooga, Tenn., 907.
—St. Louis, Mo., Car fenders removed, 305.

Saginaw, Mich.:
—Saginaw Transit Co.:
  Advertising campaign, Details, *239.
  Property in oil boom area, 626.
St. John, N. B.:
—New Brunswick Power Co.:
  Car glass set in rubber tubing [Harris], *1095.
  Car supports used in shop, *1047.
  Combination salt, sand and side wing car [Harris], 518.
St. Joseph, Mo.:
—St. Joseph Railway, Light, Heat & Power Co.:
  Belt line construction progress, 742.
St. Louis Car Co. opens steel erecting shop, *1165.

St. Louis, Mo.:
—Bill proposed to tax bus companies, 263.
—Parkway plan abandoned, 141.
—Purple Swan Safety Coach Lines:
  Receivership controversy, 58, 308, 469.
—Rapid transit enabling act, 140, 750.
—Service-at-cost franchise discussed [Bonbright], [Nash], c290; Comments on, 274.
—United Railways:
  Auditor's financial statement, 717.
  Building & Loan Assn. report, 566, 858.
  Car fenders removed by Commission, 305.
  Employment conditions, Details, 957.
  Fare controversy, 177, 259, 303, 393, 428, 711, 787, 972, 1059.
  Foreclosure plans, 435, 670, 792, 978, 1017.
  Pamphlet tells operating details, 171.
  Reorganization, 97.
  Rolling stock, Shop-built, 597.
  Tornado damage, 923.

St. Paul City Ry. (see Minneapolis, Minn.).

St. Petersburg, Fla.:
—St. Petersburg Municipal Ry.:
  Bond issue for improvements, 148.
  Referendum bond election, 219.

Salt Lake City, Utah:
—Utah Light & Traction Co.:
  Improvement program, 935.
  Trainmen's courtesy contest, 219.
  Twenty-five year veterans celebrate, *667.
  Work car equipment modernized [Heiges], *697.

Sand drying plant, Los Angeles, Cal., *211.
San Diego, Cal.:
—San Diego Electric Ry.:
  Commutator bar spacing attachment [Herms], *1091.
  Multiple-unit train service, Operating details [Averill], *167.
  Stage line purchased, 1115.
  Zone fare system, Details, *1028.

San Francisco, Cal.:
—Market Street Ry.:
  Annual report, 630.
  Armature core nuts made from pinion, *706.
  Bearings made of lead brass, Details, *1077.
  City and railway growth advertised, 862.
  Contact fingers refinished in lathe, *520.
  Disinfectant for cars, 661.
  Fire fighting truck, Details, *1137.
  Personnel changes, 932.
  Special trackwork maintenance, *659.
  Spring cushion seat order, 228.
  Truck cleaning method, 660.
—Municipal Railway of San Francisco:
  Annual report, 144.
  Bond extension controversy, 261, 712, 1013, 1059, 1113; Comments on, 1125.
  Buses used in feeder service, Details, *1135.
  Car purchase plans, 760, 890.
  Extensions planned, 149.
  Fare increase, 93.
  Financial situation, 306.
  Improvements and new projects, Details [O'Shaughnessy], *408.
  Trolley wire bids, 1070.
San Jose, Cal.:
—Railways ask fare increase, 588.

Schedules and time tables:
—Akron, Ohio, Rearrangement proposed, 392.
—Aurora, Ill., Schedule changes, 585.
—Chicago, Ill., Schedule adjustments for summer [Traiser], *867.
—Los Angeles, Cal., Schedule making and checking methods, *997.
—Paris, France, Schedules of tram and bus, Details [Mariage], *157; Comments on, 152.
—San Antonio, Texas, Alarm clocks show bus schedules, 1144.
—Youngstown, Ohio, Bus time table, *86.

Schenectady, N. Y.:
—Schenectady Ry.:
  Bus competition, Rehearing asked, 306.
  Commutation ticket sought, 178.
Scotland (see Great Britain).
Scranton, Pa.:
—Lackawanna & Wyoming Valley R.R.:
  Air compressor motor drives saw belt *342.
  Armature coil insulation removed by lye, *522.
  Portable lathe for small work, *172.
—Scranton Ry.:
  New wage agreement, 835.
  One-man cars, Specifications, *229.
Seats, Car:
—Atlantic City, N. J., Rebuilt cars, *733.
—Aluminum experimental car, Cleveland, Ohio, *655.
—Birmingham, Ala., Details, *77.
—Bucket seats, Newark, N. J., Details, *170.
—Chair, Akron, Ohio [See], *1041.
—Comfortable seats increase earnings, Comments on, 985.
—East St. Louis, Ill., Rebuilt cars, *1000.
—Fort Worth, Tex., Limited train [Hoskins], *246.
—Jamestown, N. Y., De luxe cars, *994.
—Maintenance methods, Kansas City, Mo. [Neal], *689.
—Milwaukee, Wis., *327.
—New Bedford, Mass., Rebuilt cars, *1138.
—Parlor-dining cars, South Bend, Ind., *417; Comments on, 406.
—Pleasantville, N. J., Old rattan seats stained, 577.
—Portsmouth, Ohio, *1133.
—Providence, R. I., Remodeled cars [Dickson], *988.
—San Francisco, Cal., Cushion seats ordered, 228.
—Single, De luxe car, West Penn Rys., *1036.
—Soft seats popular, Comments on, 680.
—Springfield, Mass. experimental car, Details, *562; Comments on, 559.
—Upholstered leather, Cincinnati, Ohio, rebuilt cars, *609.
—Upholstered, Rochester & Syracuse R.R., *1044.
—W. B. & A. articulated cars, *570.
—Williamsport, Pa., Upholstered seats, *728.

Seattle, Wash.:
—Pacific Northwest Traction Co.:
  Auto stages to replace interurbans, 356.
—Puget Sound Power & Light Co.:
  Interurban bus terminal construction, *587.
  Tax refund must be made by city, 435.
—Seattle Municipal Ry.:
  Bond priority suit, 1152.
  Bond redemption, plan, 358, 1152; Details, 464.
  Car designation signs, 837.
  Car purchase terms discussed, 637, 760, 930.
  Financial status, 91, 883, 925.
  Seniority rule demanded by union, 838.
  Short haul 5-cent fare system, Trial, 1013.
  Suit brought to compel cash payment to employees, Details, 218, 259.
  Survey of railway situation, 177.
  Tax to aid railway illegal, 54.
  Traffic stimulation aided by clubs, 355.
—Seattle & Rainier Valley Ry.:
  City purchase disapproved by voters, 553.
  Financial readjustment suggestions, 625.
  Franchise tax discussed, 436, 750.
—Tax suits, Disqualification proceedings, 549.

Service and tower trucks:
—B.-M. T. electric trucks used in shop, *503.
—Construction truck designed, Greensboro, N. C., *613.
—Crane for pole setting, *958.
—Dolly truck for crippled cars [Chiles], *914.
—Electric railway wrecker (Linke-Hofmann), 960.
—Line construction car, Harrisburg, Pa., *1146.
—Removable crawler tread for crane (Universal), *871.
—Rubber-tired truck for fenders, *87.
—Sand-spreading truck, Montreal [Lindsay], *688.
—Trailer trucks (American Car), *536.
—Truck for handling car axles, *526.
—Truck for transporting oil lamps, *524.
Shore Line Motor Coach Co. (see Gary, Ind.):
Shreveport, La.:
—Shreveport Railways:
  Modern cars affect riding [Hearn], c249.
Signals:
—Automatic traffic signals, Report on, 696.
—Chicago, Ill., Traffic signal control, *722; Details [Traiser], *991.
—Clearing indicator [McDonald], *912.
—London, England, Signal school, Details, *1003.
—New York City, Synchronized traffic signals, Comments on, 232.
—Oakland, Cal., Improvement plans, 983.
—Philadelphia, Pa., Subway signal contract, 1123.
—Standardization recommended in New York, Details, *940; Comments on, 938.
—Traffic signals help relieve congestion [Traiser], 1128.
—Sioux City Service Co.:
Sioux City, Iowa:
  Financial report, 883.
Snow and ice removal:
—Boston Elevated Ry. methods, Details [Steward], *567.
—Chicago, Ill., Snow plow built in shops, Design, Details [Wheeler], *286.
—Combination salt, sand and side wing car, St. John, N. B. [Harris], 518.
—Grand Rapids, Mich., Combined snow scraper and sweeper, *380.
—Kansas City, Mo., Snow plow attachments, 824.
—Snow loader, Improved type, *134.

Snow and ice removal (Continued):
—Toledo, Ohio, Improving sweeper brooms [Smith], *461.

South Bend, Ind.:
—Chicago, South Shore & South Bend R.R.:
  Bus and rail terminal plans, 889; Installation, 1155.
  Dining and parlor car service installed, 417; Comments on, 406.
  Employees awarded better business prizes, *1111.
  Improvement program, Details, 228.
  Locomotives ordered, 677.
  Parlor car trains installed, 836.
  Personnel changes, 268.
  Summer excursion rates, 789.
—Transportation used by store customers, Survey, 995.
South Carolina Power Co. (see Charleston, S. C.):
Southern Indiana Gas & Electric Co. (see Evansville, Ind.):
Southern Ohio Public Service Co. (see Zanesville, Ohio):

Southern Pacific Ry.:
—Bus service plans opposed, 839.
—Auxiliary bus service installed, 790.
—Switching arrangements, Oakland, Cal., Details, *1037.
Southwestern Public Service Assn.:
—Annual meeting, Running report, 784, 827; Comments on, 803.
Southern Public Utilities Co. (see Charlotte, N. C.):
Special trackwork:
—Electric track switch, Oakland, Cal., *1037.
—Repairing, Comments on, 679.
—San Francisco, Cal., Maintenance methods, *659.
—Track switch developed in Knoxville, Tenn., *485.
—Unit switch, Improved construction, 345.
Spokane, Wash.:
—Spokane United Rys.:
  Business institutions give free rides to customers, 431.
—Inland Empire R.R.:
  Name changed to Spokane & Idaho Northern, 354.
  Ownership changed, Comments on, 1027.

Springfield, Mass.:
—Springfield Street Ry.:
  Bus operating plans, 552, 790.
  Cars ordered, Specifications, *595.
  Control passed to N. Y., N. H. & H., 359.
  Experimental car, Design, Details, *562; Comments on, 559, 599.
  Track reconstruction progress, 982.
  Worm-drive car tests, Details, 713, *859; [Wood], *c822; Comments on, 725.

Springfield, Ohio:
—Indiana, Columbus & Eastern Traction Co.:
  Bus windshields kept free from frost, *1145.
  Oxyacetylene torch, Uses of [Foote], *576.
  Passenger cars rebuilt for freight trailers, *162.

Standardization:
—Developments in 1926, 27; Comments on, 67.
—Freight cars, C.E.R.A. rules, *961; Comments on, 67.
—Freight equipment, Discussed by C.E.R.M.M.A., *918; Comments on, 891.
—Government active in, 114.
—Journal bearings, Dimensions, *527.
—Paving brick, 888, *1164.
—Plain and lock washers, 53.
—Standard specifications should be utilized [George], c742.
—Track standards, Comments on, 1072.
—Traffic signal standardization recommended in New York, Details, *940; Comments on, 938.
—Trolley wire, A.E.R.E.A. report, 709.
—Wheel tread and flange contours, *528.

Stark Electric Co. (see Alliance, Ohio):

Statistics:
—Abandonments in 1926, *43; Comments on, 2.
—Automotive equipment ordered in 1926, *33, 85; Comments on, 3.
—Bond issues and maturities, 1926, *31; Comments on, 31.
—Boston Elevated Ry. increase since 1897, 719.
—Business outlook for 1927, 149.
—Bus operating costs, Youngstown, Ohio [Graham], *371.
—Bus operation by electric railways, 1926, *33; Comments on, 3.
—Bus operation by electric railways in Indiana, 169.
—California, Bus operating report [McCabe], *866.
—Canadian railway operations, Survey, *852; Comments on, 849.
—Cars, Orders analyzed, 1926, *20; Comments on, 4, 67.
—Czechoslovakian electric railways [Neithammer], *79.
—Electric railway operations in 1926, A.E.R.A. report, 792; Comments on, 764.
—Heavy electric traction, 1926 work reviewed, *43.
—Holland, Railway, trackless trolley and bus operation compared, *612.
—Loading platforms, Survey [Miller], *642; Comments on, 641.
—New York City, Railroad and ferry passengers in 1926, 780.
—Passengers carried by public and private vehicles [Miller], 257.
—Passenger traffic 1920-26, Winnipeg, Can., 471.
—Pull-in record, 1926, Southern Properties, 250.
—Purchases planned by railways, 1922-27, *11; Comments on, 2, 68.
—Railway costs and fares, 1926 [Richey], *28; Comments on, 68.

Statistics (Continued):
—Railway developments in 1926, 5; Comments on, 1, 2.
—Receiverships in 1926 reviewed, *40; Comments on, 67.
—Reports, Financial (see Financial reports).
—Rolling stock ordered, 1916-26, *20; Comments, 4, 67.
—South Bend, Ind., Transportation used by store customers, Survey, 995.
—Standardization developments in 1926, 27; Comments on, 67.
—Trackage of National Public Service Corp., 553.
—Track construction in 1926, *43; Comments on, 2.
—Traffic, fare and wage figures, A.E.R.A. report, 265, 670, 841.
—Vehicle traffic, Chicago, Ill., 70.
—Vienna traffic, Review, *411.

Steps, Car:
—Metal steps reduce maintenance, *661.

Stores:
—Armature, Stands for storing, *706.
—Axle storage, Richmond, Va., *525.
—Compressor brush storage, *825.
—Electrical material storage, Chicago, Ill. [Smith], *682.
—Light bar steel storage, Rack for, *343.
—Purchasing and stores system, P.R.R., 214.
—Sand storage bins, Richmond, Va., *293.
—Scaffold plank storage, *341.

Storm and fire damage:
—Mississippi Valley flood, 879; Comments on, 763.
—Nashville, Tenn., Flood, Details, *651.
—New York City, Subway fire, *788.
—St. Louis, Mo., Tornado damage, 923.

Street traffic congestion:
—Automobile saturation problem, 926; Comments on, 1126.
—Chicago, Ill., Jaywalker survey, 878; Comments on, 851.
—Decreasing congestion losses, 170.
—Discussed by N.A.C. of C., 748.
—New York City [Langan], c86.
—Organized street use, Comments on, 1027.
—Problems of mass transportation [Bibbins], 735; Comments on, 726.
—Railways can lead in reducing [Traiser], *1128.
—Traffic lane capacity, New York City, 237.
—Traffic problem discussed by Central States Safety Congress, 748.

Strikes and arbitrations:
—Capital Traction Co., Arbitration settlement, 878.
—Erie, Pa., Wage arbitration, 837.
—Illinois Traction, Wage arbitration, 837.

Substations and equipment:
—Automatic:
  Chicago Surface Lines, Details, 800; [Noah], *863.
—Cape Town, South Africa, Automatic, 627.
—Milwaukee, Wis., Order for, 846.
—Montreal, Can., Automatic mercury arc rectifier, Details, *766; Comments on, 764.
—Rectifier order, New Haven, Conn., 189.

Superior, Wis.:
—Accident caused by man failure, 220.

Switzerland:
—Electrification progress, 394.

Syracuse, N. Y.:
—Rochester & Syracuse R.R.:
  Cars modernized, Details, *1044.
—Syracuse & Eastern R.R.:
  Fare increase sought, 261.

T

Tacoma, Wash.:
—Tacoma Railway & Power Co.:
  Citizens interviewed on service, 392.
  City engineer criticizes handling methods, 878.
  Fare changes, 837.
  Franchise changes require vote of people, 586.
  Ticket rates readjusted, 353.

Taxes:
—California, Railway tax ruling, 310.
—Connecticut, Interstate bus tax, 222, 356.
—Dallas, Texas, Bus capacity tax questioned, 434.
—Detroit, Mich., Paving relief sought, 261, 393; Comments on, 765.
—Gross net tax, Progress [Vickers], c383.
—Hartford, Conn. loses tax suit to railway, 714.
—Indiana, Revenue from utility taxes, 412.
—Law forbids tax to aid Seattle railway, 54.
—Maryland, Gasoline tax rebate, 665.
—New York, Railway taxes discussed by Mr. Merrill, 260; Comments on, 233.
—Ohio utilities excise tax bill, 753; Comments on, 727.
—Pennsylvania, Gas tax, 881.
—Pennsylvania, Paving relief bill defeated, 749.
—Philadelphia, Pa., Interstate bus tax upheld, 790.
—Reduction in corporation income tax urged by U. S. C. of C., 1015; Comments on, 1026.
—Rochester, N. Y., Railway taxes paid in 1926, 772.
—St. Louis, Mo., Bus taxes, 263, 716.
—Seattle, Wash., Franchise tax relief sought, 750.
—Seattle, Wash., Tax refund decision, 435.
—Texas, Tax relief bill, 471.
—Utility taxation systems reviewed [Seligman], 199; Comments on, 233.
—Wisconsin, Gasoline tax increase bill, 309.

Taxicabs:
—Cincinnati, Ohio regulation, 716.
—Minneapolis, Minn., Railway installs, 95; Comments on, 69.

Tennessee Electric Power Co. (see Chattanooga, Tenn.):

Tennessee, State of:
—Bill against one-man cars lost, 789.

Terminals and waiting stations:
—Aurora, Ill., Plans for terminal, 477.
—Chicago, Ill., Platforms lengthened, 926.
—Chicago, Ill., Terminal construction, 587.
—Cleveland, Ohio, Station construction, Details, *247.
—Greensburg, Pa., Terminal improvements, *1001.
—Highwood, Ill., New station, Details, 57, *238.
—Illinois Traction, Clean station prizes, 1043.
—Interurban stations, Comments on, 481.
—Loading platforms, Use and construction, Survey [Miller], *642; Comments on, 641.
—Michigan City, Ind., Bus and rail terminal, 889, 1155.
—Montreal, Suburban station, Details, *944.
—Seattle, Wash., Bus-interurban terminal, *587.
—Youngstown, Ohio, Bus stations [Graham], *413.

Terre Haute, Indianapolis & Eastern Traction Co. (see Indianapolis, Ind.):

Tests of material and equipment:
—Air equipment testing, Ft. Wayne, Ind. [Reddersen], *338.
—Armatures, Bar-to-Bar test, *130.
—Axles tested for trueness, *292.
—Base plate rail joint tests, Boston, Mass. [Walker], *773.
—Bond-testing methods, Charleston, W. Va. [Albert], 1005.
—Cement tests, France, *386.
—Fageol twin coach, Chicago, Ill., 469.
—Field coil tests *108.
—Locomotives, Electric, Testing methods, I.C.C. decision, 581.
—Pavement damages from overloaded trucks, Comments on, 891.
—Rail strength tests, Europe [Fremont], *283.
—Steam bus tested, New York City, 357.
—Storage battery locomotive, *83.
—Tie tamper, Electric, *89.
—Worm-drive car, Springfield, Mass., 713; [Wood], *c822; *859; Comments on, 725.
—Worm-drive trucks, Joliet, Ill., Details, *954.

Texas Electric Ry. (see Dallas, Texas):

Third Avenue Ry. (see New York City):

Ties:
—Boston, Mass., Treated ties, Details, *320, Comments on, 317.
—Creosoted ties, Illinois Traction, *379.
—Steel ties, Atlantic City, N. J. [Ashbridge], *1074.
—Treated ties, Atlanta, Ga., Details [Smith], *455; Comments on, 444.

Tires:
—Trackless trolley fitted with pneumatic tires, Ipswich, England, *996.

Toledo, Ohio:
—Bus ordinance, 395.
—Community Traction Co.:
  Annual report, 1159.
  Employees get new uniforms, *714.
  Franchise negotiations, 393, 787, 1109.
  Improving snow sweeper brooms [Smith], *461.
  Wage controversy, 1111.

Topeka, Kans.:
—Topeka Railway:
  Bus service, 143.

Toronto, Can.:
—Toronto Railway:
  Liquidation dividend, 792.
—Toronto Transportation Commission:
  Bids on new cars asked, 442.
  Bow collector, Automatic reversing, *421.
  Gage change of radials opposed, 880.
  One-man car rights sustained, 352; Comments on, 318.
  Radial railway control taken over, 265.
  Scrap materials sold, 1024.
  Ventilation system, 974.

Track construction:
—Boom extension for ditching machine, *1049.
—Building track in salty sand [Ashbridge], *1074.
—Cincinnati, Ohio, Reconstruction program, Details, *903.
—Compressor outfit, Los Angeles, Cal., *424.
—Highway crossings construction, Ill. Traction, *379.
—Kansas City, Mo., Reconstruction, Details, *113.
—Milwaukee, Wis., Interurban cut-off, 577; Details, *1085.
—New Haven, Conn., Reconstruction methods [Johnston], *691.
—Omaha, Neb., Plans for 1927, 363.
—Paved-track data in pamphlet, 271.
—Pittsburgh, Pa., Details [Williams], *495.
—Review of 1926, Statistics, *43; Comments on, 2.
—Richmond, Va., Extensions, Progress, 890.
—San Francisco, Cal., Extensions [O'Shaughnessy], *408.
—Springfield, Mass., Progress, 982.
—Tie tamper, Electric, Details, *89.

Trackless Trolleys:
—Chesterfield, England, Trolley buses adopted, 221.
—Ipswich, England, Design *996.

Track maintenance:
—Boston, Mass., Snow-fighting methods and equipment [Steward], *567.
—Chicago Surface Lines, Methods [Wolfe], 618.

Track maintenance (Continued):
—East Chicago, Ind., Improvement plans, 761.
—Equipment for:
  Air compressor, Portable [Sullivan], *541.
  Arc welder (Railway Track-Work), *542.
  Arc welding equipment (Westinghouse), *542.
  Asphalt repair plant, Portable [Chausse], *541.
  Concrete breakers (Sullivan), *543.
  Contact book and pole (Railway Track-Work), *541.
  Oil preheater (A. Milburn), *541.
  Oxyacetylene plant, Portable (A. Milburn), *542.
  Rail joint grinder (Railway Track-Work), *541.
  Track grinder, Rotary (Railway Track-Work), *542.
—Hazards of [Matthews], c957; Comments on, 987.
—Highway crossing made of old rail, E. St. Louis, Ill. [Baker], *812.
—Improved thermit nozzle holder for rail welding, *661.
—Machine holds rails for welding [Taurman], *1094.
—Maintaining track in salty sand, Atlantic City, N. J. [Ashbridge], *1074.
—New Haven, Conn., Methods [Johnston], *691.
—Pittsburgh, Pa., Methods [Williams], *495.
—Power take-off for portable tools, *523.
—Rail alignment and repairing, Erie, Pa., *331.
—Rail corrugation, Effect of abrasion and compression [Fremont], *283.
—Rail corrugation in Europe, Details [Ewing], 281.
—Railroad crossing made of old rail, Galt, Ont. [Midgley], *1096.
—Reciprocating grinder, *212.
—Washington, D. C., Welding track, Details [Goucher], *486.

Traffic investigations:
—Birmingham, Ala., Survey report, 973.
—Boston, Mass., Survey plans, 467.
—Chattanooga, Tenn., Survey report, 713.
—Chicago, Ill., Survey, Report, *70, 170; Comments on, 69, 107, 231.
—Curbstone parking, Survey of 17 cities, 124.
—Macon, Ga., Survey proposes rebuilding railway, 432.
—New Jersey-New York rapid transit loop, Report, *333.
—New York City, Subway system survey to be made, 712.
—Philadelphia, Pa., Survey, Report, 93, 178, 584, 749.
—Providence, R. I., Transit study proposed, 1012.
—Seattle, Wash., Survey of railway situation, 177.
—South Bend, Ind., Transportation used by store customers, Survey, 995.
—Traffic control methods to be surveyed, 198.
—Vienna traffic, 21 year review, *411.
—Williamsport, Pa., Citizens' survey, Report, *728.

Traffic regulation:
—Automatic signals, Report on, 696.
—Chicago, Ill., Details [McIlraith], 619.
—Chicago, Ill., Traffic signal control, Details [Traiser], *991.
—Cincinnati, Ohio, New regulations, 1031.
—Laws against slow driving recommended, 416.
—Organized street use, Comments on, 1027.
—Pedestrian regulation [McIlraith], c957.
—Problems of mass transportation [Bibbins], 735; Comments on, 726.
—Survey to be made of traffic control methods, 198.
—Synchronized signals, N. Y. C., Comments on, 232.
—Wise rules vital to community [McIlraith], 619.

Traffic stimulation:
—Akron, Ohio, Buses rerouted, 586.
—Cooperation with police, Comments on, 275.
—Depot service, El Paso, Texas, *902.
—Levis, Que., Holiday gifts increase riding, 141.
—Loading platforms, Wilkes-Barre, Pa., *202.
—Modern cars increase riding [Chiles], c249; [Bucher], c249; [Hearn], c249.
—Safety platforms aid, Survey [Miller], *642; Comments on, 641.
—Westfield, N. Y., Special fares offered to baseball games, 973.

Transportation, Metropolitan:
—Changing aspects discussed, 714.
—Community welfare demands improvements [Sawyer], 830.
—Manufacturer and operator cooperation needed [Sawyer], *123; Comments on, 151.
—Modernization, Methods discussed [Graham], 125; Comments on, 151.
—"Popular" or mass transportation [Smith], [Mitchell], c383; [Jackson], c423; Comments on, 273.
—Private vs. public transportation, Comments on, 937.
—Problems and coordination [Sawyer], 387.
—Problems of mass transportation [Bibbins], *735; Comments on, 726.
—Regulation affects, Comments on, 405.
—Three classes of service, says T. E. Mitten [Gordon], *368.
—Trends discussed by U. S. Chamber of Commerce, 875.
—Transit needs discussed by H. A. Johnson, 710.

Trenton, N. J.:
—Trenton & Mercer County Traction Corp.:
  No accident bonus plan, 354.

Tri-City Railway of Illinois (see Rock Island, Ill.):
Tri-City Ry. of Iowa (see Davenport, Iowa).
Trolley base (G. E.), *294.
Trolley wire, Choice of alloy [Neild], 1052, 1107.
Trucks:
—Car truck designed by Mr. Blackhall, 579; Comments on, 561.
—Cleaning method, San Francisco, Cal., 660.
—Design change reduces breakage [Clarkson], *1091.
—Springfield, Mass., Experimental car, *562; Comments on, 559.
—W. B. & A. articulated cars, Details, *570; Comments on, 559.
—Wheel fenders protect, Porto Rico, *322.
—Worm-drive, New development, Joliet, Ill., Details, *602, *954; Comments on, 599.
Trucks, Motor:
—Compressor outfit on bus chassis, *424.
—Fire fighting truck, San Francisco, Cal., *1137.
Tunnels:
—Moffat, First section completed, *430.
—New York-New Jersey tunnel extension urged, 1012.
Twin City Rapid Transit Co. (see Minneapolis, Minn.)

U

Union Street Ry. (see New Bedford, Mass.).
United Electric Rys. (see Providence, R. I.):
United Railways (see St. Louis, Mo.).
United Railways & Electric Co. (see Baltimore, Md.).
United Suburban Ry. (see Grandville, Mich.).
United Traction Co. (see Albany, N. Y.).
Utah-Idaho Central R.R. (see Ogden, Utah).
Utah Light & Traction Co. (see Salt Lake City, Utah).
Utah, State of:
—Paving measure, 626.

V

Valley Rys. (see Lemoyne, Pa.).
Virginia Electric & Power Co. (see Richmond, Va.).
Virginia, Minn.:
—Mesaba Railway:
Abandonment sought, 399.

W

Wage decreases:
—Buffalo & Erie Ry., 789.
—St. Petersburg, Fla., 181.
Wage increases:
—Aurora, Ill., 588.
—Boston, Mass., 786.
—Brooklyn, N. Y., 836.
—Edmonton, Alta, 974.
—Indianapolis, Ind., 1013.
—Interborough Rapid Transit Co., 625.
—Milwaukee, Wis., 262.
—Missouri, 1915-25, 62.
—Richmond, Va., 141.
—Scranton, Pa., 835.
—Trenton, N. J., 838.
—Winnipeg, Can., 1060.
Wages and working agreements:
—A E R.A. figures, 1925-26, 265, 670, 841, 1062.
—Atlanta, Ga., Contract renewed, 220.
—Chicago, Ill., Increase asked, 973, 1060.
—Conspectus of indexes, 185, 398, 592, 754, 978, 1158.
Wages and working agreements (Continued):
—Indianapolis, Ind., Increase asked, 260.
—Indianapolis, Ind., One man's wages increased by Commission, 750, 1013.
—New Haven, Conn., Negotiations, 1154.
—Rochester, N. Y., Negotiations, 549, 668, 837, 922, 972, 1059.
—Rome, Italy, Details [Blake], *935.
—St. Louis, Mo., Data shows improvement, 957.
—Seattle, Wash., Suit to compel cash payment to employees, 218, 259.
—Trend in 1926 [Richey], *28; Comments on, 68.
—Winnipeg, Can., Wage agreement, 1060.
Washington, Baltimore & Annapolis Electric R.R. (see Baltimore, Md.):
Washington, D. C.
—Bus lines sold, 1118.
—Capital Traction Co.:
Annual report, 1063.
Arbitration agreement, 878.
Axles tested for trueness, *292.
Sawing machine saves labor, *461.
Valuation case appealed, 310, 398.
Welding track without car delays [Goucher], *486.
—One-man car operation, Study to be made, 751.
—Railway merger to be studied by Congress, 555.
—Washington Railway & Electric Co.:
Annual report, 397:
Carrier removes broom motors [Blaiklock], *1093.
Operating agreement suit, Decision, 1154.
Parowax method for determining flange wear [Blacklock], *913.
—Washington-Virginia Ry.:
Foreclosure sale, 266, 882.
Plan to reclaim road, 435, 976.
Watertown, N. Y.:
—Black River Traction Co.:
Fares increased, 180.
Welding:
—American Welding Society symposium, 834.
—Arc welder, Machine driven [Lincoln], *783.
—Arc welder, Portable resistance, *252.
—Brake beams, Worn, Welding process, 344.
—Combination cutting and welding equipment [A. Milburn], *529.
—Portable steel welder [Lincoln], *345.
—Miller medal donated by Am. Welding Society, 1070.
—Prizes offered for papers on arc welding, 462, 1164.
—Rail joints, Bangor, Me., *133.
—Thermit welding, Improved nozzle holder, *661.
—Track welding, Washington, D. C., Details [Goucher], *486.
—Welding rod [Lincoln], 960.
—Welding torch (Air Reduction), *531.
West Chester, Pa.:
—West Chester Street Ry.:
Bus subsidiary reorganized, 552.
West Penn Rys. (see Pittsburgh, Pa.):
Wheeling, W. Va.:
—Wheeling Public Service Co.:
Cars ordered, Specifications, *441.
Rides free on Community Day, 56.
Paving relief denied, 1011.
Weekly pass sales increased, 305.
Wheels and axles:
—Adjustable collar, Details, *292.
—Atlanta, Ga., Maintenance practice [Squires], 255.
—Axle arrangement, Berlin, Germany [Pforr], *203.
—Axle storage, Richmond, Va., *525.
—C.E.R.A. standard for freight cars, *961.
—Joliet, Ill., New axle construction, Details, *602; Comments on, 599.
—Machining New tools for, *531.
Wheels and axles (Continued):
—Polishing bearing surfaces of axles, *526.
—Repair equipment for, B.-M. T., *503.
—Springfield, Mass. experimental car, *562; Comments on, 559.
—Tests for trueness, *292.
—Truck for handling car axles, I.R.T., *526.
—Wheel flanges built up by welding, *869.
—Wheel removal [Foote], c698.
—Wheels, Removing and pressing on methods, Hazleton, Pa., *331.
—Wheel tread and flange contours, Standard, *528.
—Worm-drive axles discussed in Timken magazine, 1166.
Wilkes-Barre & Hazleton Ry. (see Hazleton, Pa.):
Wilkes-Barre, Pa.:
—Wilkes-Barre Ry.:
Armature winding truck, Portable, *521.
Armature stands for storing, *706.
Linoleum and rubber mats on car floors, *385.
Loading platforms erected, *202.
Shop construction started, 403.
Williamsport, Pa.:
—Williamsport Passenger Ry.:
Carhouse and shops inspected by public, 429.
Cars ordered, Specifications, *103.
Commutator slotter on lathe stand, *87.
Motor heads reclaimed, *523.
Reorganization, Details, *728; Comments on, 765.
Winnipeg, Man., Can.:
—Winnipeg Electric Co.:
Car inspection [Watkins], 1105.
Customer-ownership campaign, 97.
Franchise situation, 353.
Passenger traffic 1920-26, 471.
Wage agreement, 1060.
Wisconsin, State of:
—One-man car opposition in legislature due to Superior accident, 220.
Wisconsin Utilities Assn.:
—Committee appointments, 1010.
Wood preservation:
—Atlanta, Ga., Methods and equipment, Details [Smith], *455; Comments on, 444.
—Boston, Mass., Timber preservation, Details, *320; Comments on, 317.
—Preservative treatment of poles [Boehne].
Worcester, Mass.:
—Worcester Consolidated Street Ry.:
Bus company purchased, 434.
Bus extension plans, 552.
Cars ordered, Specifications, *595.
Personnel changes, 399.
Salt purchases, 403.

Y

York, Pa.:
—York Railways:
Refuse car, Screened, *329.
Truck for handling fenders, *87.
Truck for transporting oil lamps, *524.
Youngstown, Ohio:
—Pennsylvania-Ohio Electric Co.:
Bus operation, Details [Graham], *371.
Bus service augments cars, *86.
Interurban bus service, Details [Graham], *413; Comments on, 406.
Personnel changes, 362.

Z

Zanesville, Ohio:
—Southern Ohio Public Service Co.:
Transportation situation in Newark, Details, 138; Comments on, 107.

READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX
Abbreviations: *Illustrated. c Communications.

AUTHOR INDEX

A

Albert, J. E.:
—Cold steam process used for cleaning, c908.
—Resistance welder used for bonding load, 1005.
An Interurban Patron:
—Motormen's badges are poor advertisements for heavy interurbans, c422.
Ashbridge, R. I. D.:
—Building and maintaining track in salty sand, *1074.
Aspinwall, L. M.:
—Momentary stresses developed while bucking railway motors, *950.
Averill, R. G.:
—Cab-controlled couplers speed up San Diego service, *167.
Axtell, C. J.:
—Improvements made in car equipment apparatus, 254.

B

Baker, Emerson W.:
—Rehabilitation increases riding on the Fitchburg Railway, *738.
Baker, S. Clay:
—Durable highway crossing made of old rail, *812.
Bange, C. M.:
—Locomotives constructed out of bridge material, *649.
Barnhart, J. D.
—Car maintenance and shop practices, 616.
Bibbins, J. Rowland:
—Problems of mass transportation, 735.
Bickford, E. F.:
—Accidental and intentional radio interference, 968.
Bigelow, H.:
—Extensive rehabilitation program planned by South Carolina Power Company, c339.
Blaiklock, J. B.:
—Carrier for removing broom motors, *1093.
—Parowax method for determining flange wear, *913.
Blair, D. E.:
—Mileage the logical basis for bus depreciation, 1104.
Blake, Henry W.:
—Transportation in the Eternal City, *945.
Boehne, E. E.:
—Preservative treatment of pine poles, *1103.
Bolt, W. C.:
—New equipment saves $1,528 per car per year, *207.
Bonbright, James C.:
—Wide range of thinking on service at cost, c290.
Boyce, W. H.:
—Development of miscellaneous revenue, 1055.
Brann, C. A.:
—Telling the company's story to a new man, 834.
Brosseau, A. J.:
—Field of the motor bus, 1149.
Brown, F. W.:
—An added source of revenue, *161.
Bucher, Henry:
—Attractive cars and frequent service solved Fort Wayne problem, c249.

C

Cauer, W.:
—German road makes progress, *1131.
Chiles, R. T.:
—Attractive cars increase riding, c249.
—Dolly truck for crippled cars, *914.
—Repairing steel side sheets of cars, *1093.
Clark, A. T.:
—Frequent painting required, *498.
—Rolling stock should give the best impression possible, 116.
Clarkson, Edwin R.:
—Changes reduce truck breakage, *1091.
Colby, A. C.:
—Old cars should be replaced as fast as possible, c289.
Cole, A. B.:
—Ton-mile freight cost, 813.
Copley, C. H.:
—Regrinding brake drums for buses, *1095.
Crawford, J. B.:
—Efforts to reduce radio interference successful at Concord, 969.

D

Dean, John S.:
—Protection for commutator V-bands, 1006.
—Sleeves for cable leads, *660.
—Smooth surfaces an aid to tight bearings, *782.
Dickson, E. J.:
—Good service in attractive cars increases riding, *988.
Donley, J. B.:
—Popularizing electric railway service in Pittsburgh, 175.
Duffy, J. A.:
—More perfect alignments results from boring armature bearings after installation in housings, *1092.

E

Ewing, D. D.:
—Co-ordinated study of rail corrugation made in Europe, 281.

F

Feustel, Robert M.:
—Financial reorganization saved the original investment, 296.
Foote, F. J.:
—Difficulties in wheel removal discussed, c698
—Some shop uses for the oxyacetylene torch, *576.
Frehse, Ray S.:
—Stepping on it, 254.
Fremont, Ch.:
—Effect of abrasion and compression on rail corrugation, *283.

G

Geibel, F. E.:
—Street congestion increases car repairs, 781.
George, Howard H.:
—Proposed fire protection regulations undesirable, c868.
—Standard specifications should be utilized, c742.
Gilbert, P. A.:
—Method of removing broken cap screws, *911.
Goldberg, Hon. Louis:
—Reproduction cost unsatisfactory as basis for rate making, 964.
Gordon, Charles:
—Three classes of service, says T. E. Mitten, *368.
—You can't steel cotton goods in a sick age, 1087.
Goucher, Edwin P.:
—Welding track without car delays, *486.
Graham, R. N.:
—Development of commercial sense needed, 125.
—Fitting the bus to its proper place, *371.
—Interurban service offers broad field for bus, *413.
Green, George R.:
—Master mechanics are working for progress, c957.

H

Harris, George H.:
—Buses and cars give co-ordinated local and express service, *607.
Harris, Robert:
—Car glass set in rubber tubing, *1095.
—Combination salt, sand and side wing car, 518.
Hearn, H. B.:
—Safe, clean and comfortable cars a first need, c249.
Heiges, F. D.:
—Modernizing work car equipment at Salt Lake City, *697.
Herms, Charlie:
—Commutator bar spacing attachment for slotting machine, *1091.
Hodges, A. L.:
—Accident prevention bonus—a means to an end, 215.
Holtzclaw, J. G.:
—How far should we go in "dressing up" street cars? 833.
Horner, W. M. C.:
—Air brake requires proper installation and maintenance, 389.
Hoskins, George:
—More comforts added to Crimson Limited, *246.

J

Jackson, Walter:
—Popular or mass transportation, c423.
Johnston, M. M.:
—Extensive annual track reconstruction done by Connecticut Company, *691.

K

Kyle, C. A.:
—Tempering and resetting springs, *576.

L

Lambert, M. B.:
—Create the demand for modern street cars, 299.
Langan, T. R.:
—Traffic congestion editorially approved, c86.
Lindsay, A. M.:
—Economic methods of salvaging seat pedestals, *1005.
—Truck sands bus routes, *688.
Love, Nelson R.:
—Headway recorder centralized in dispatcher's office at Denver, *419.

Mc

McAloney, W. H.:
—Atlanta devotes much attention to car appearance, c459.
McCabe, George K.:
—California motor transport shows declining profits, *866.
McDonald, H. P.:
—Motor coach maintenance, 545.
McIlraith, E. J.:
—Intent of Chicago traffic code explained, c957.
—Wise traffic regulations vital to modern communities, 619.
McMahon, C. R.:
—Clean, bright cars attract riders, c575.
—Judging maintenance by car failures, c698.
McRae, W. R.:
—Study car equipment with reference to appearance, comfort and convenience, 115.
McWhirter, J. S.:
—Clean cars hold patronage, *482.
McWhorter, A. D.:
—What constitutes a "Pull-in?" c128.

M

MacDonald, Jay:
—Clearing indicator assists one-man operator, *912.
MacMurray, G. J.:
—Some of us would be homesick in Heaven, *13.
Mariage, Paul:
—Increasing car speeds and rush-hour carrying capacity, *157.
Matthews, W. G.:
—Hazards of street work increasing, c957.
Mehren, Edward J.:
—American ideas at economic conference, 1022.
—Capitalism and communism at grips in Geneva, 982.
—Conference recommends remedies, 1068.
—Pools and cartels summarized at Geneva, 1122.
—World clinic on economic ill goes forward in Geneva, 933.
Meriwether, Richard:
—Making partners of our customers, *777.
Midgley, F. H.:
—Old rails used for railroad crossings, *1096.
Miller, John A., Jr.:
—Minority only benefits by parking, 256.
—Safety platforms aid traffic movement, *642.
Mitchell, John H.:
—It hits the nail on the head, c383.
Mitten, T. E.:
—Three classes of service, *368.
Muse, E. J.:
—The "Texas idea" in street car publicity, *163.
Myers, A. C.:
—Speedy and attractive cars needed, c289.

N

Naquin, A. J.:
—Overhauling on a 40,000 mile basis, 256.
Nash, L. R.:
—Wide range of thinking on service at cost, c290.
Neal, R. S.:
—Remodeling, repainting and overhauling methods in Kansas City, *689.
Neithammer, Dr. F.:
—Electric Railways of Czechoslovakia, *79.
Noah, B. G.:
—New automatic substation for the Chicago Surface Lines, *863.
Neild, J. F.:
—Choice of alloy trolley wires, 1052.

READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX
Abbreviations: *Illustrated. c Communications.

Noonan, T. W.:
—Congestion relief with de luxe coaches, *298.

Norris, H. H.:
—Foreman conferences can help, c86.

O

O'Brien, R. M.:
—Hinged gasket boards conserve space, *1096.
—Tool and truck maintenance parts board, *913.

O'Shaughnessy, M. M.:
—$3,500,000 for expansion of transportation facilities in San Francisco, *408.

Oswald, M. J.:
—Modernization of cars, 621.

P

Palmblade, R. F.:
—One man better than two, 580.

Palmer, E. A.:
—Increasing speed and comfort by modernization of equipment, 300.

Pforr, Wilhelm:
—Berlin carries out extensive car improvement program, *203, 243.

Plimpton, R. E.:
—The five fundamentals of co-ordination, *234.

Pontius, P. A.:
—Correct motor repairs keeps gear-center distance accurate, *1080.
—Maintaining proper gear-center distances, *899.

Potter, Harold E.:
—Older cars should not contrast too greatly with recent purchases, c423.

Potter, R. R.:
—Cleanliness a first requisite, c289.

R

Raymur, J. G.:
—The glory is Rome's, c1145.

Reddersen, Arthur W.:
—Air equipment tested in place on cars, *338.

Reed, E. D.:
—Bus and vehicle maintenance, *515.

Reifschneider, Felix E.:
—What does the public want—low car fares or service? c459.

Rexroth, A. F.:
—Weekly washing keeps cars attractive, *341.

Richardson, G. A.:
—Further comments on Chicago bus proposal, c171.

Richey, Albert S.:
—Electric railway costs and fares in 1926, *28.

Ritchie, J. A.:
—Mr. Ritchie presents bus viewpoint, c52.

Rossell, W. T.:
—Agrees on need of Research Department, c742.
—Modern production methods may be applied to maintenance work, 349.

S

Sarre, A. J.:
—Training electric railway employees for their jobs, 831.

Sawyer, W. H.:
—Community welfare demands transportation improvement, 830.
—Our primary interest lies in the upbringing of our communities, 276.
—President Sawyer commends Graham articles, c574.
—Transportation a community problem, 387.
—We are acquiring a new viewpoint, *123.

Schorn, Nich. J.:
—Further comments on Chicago bus proposal, c171.

Scott, Angus:
—Overhead fixtures inspected on a car-pass basis in Cleveland, *896.

See, Pierre V. C.:
—Keeping cars attractive at small cost, *1041.

Segard, Dr. C. P.:
—Accident prevention work on Third Avenue System, 216.

Seligman, Edwin R. A.:
—Taxing the utility, 199.

Shaughnessy, T. H.:
—100 per cent operation, *492.

Shoup, Paul:
—Mr. Shoup comments on Graham articles and bus experience, c821.

Smith, C. A.:
—Substantial economies obtained by use of treated timber, *455.

Smith, Dwight L.:
—Careful organization of force stimulates effort, *682.
—Electrical maintainers are not trouble men, *511.

Smith, P. A.:
—Approves use of "popular" transportation, c383.

Smith, William J.:
—Improving sweeper brooms, *461.

Squires, J. H.:
—Wheel and axle maintenance at Atlanta, 255.

Steward, H. M.:
—Snow-fighting methods revolutionized, *567.

Stier, G. H.:
—Careful inspection program gives good results, c339.

Storrs, Lucius S.:
—Public is getting better understanding of local transportation, 828.
—Transportation winning hardest business battle in history, *449.

T

Taurman, A.:
—Alemite lubrication for half-ball brake hangers, *914.
—Machine holds rails while welding compromise joints, *1094.

Thompson, James:
—Causes of radio interference analyzed, 967.

Traiser, L. M.:
—Chicago extends construction of concrete loading platforms, *816.
—Plan schedule adjustments now for reduced summer riding, *867.
—Railways can take lead in reducing traffic congestion, *1128.
—Traffic signals fitted to complicated intersections, *991.

V

Vickers, Leslie:
—Gross net tax making progress, c383.

W

Walker, Frank B.:
—Base plate joint developed by Eastern Massachusetts Street Railway, *773.

Watkins, J. E.:
—Simplifying car inspection, *1105.

Westman, A. J.:
—Economics in power distribution, 1054.

Weyman, H. E.:
—One-man fare collection on suburban and interurban railways, 1053.

Wheeler, W. C.:
—Chicago builds an improved snow plow, *286.

Williams, H. S.:
—Aluminum covers for stanchions, 615.
—A.E.R.E.A. research department proposed, c575.
—Higher standards of maintenance will improve performance and reduce costs, *347.
—Simplifying lubrication of center bearings, *1092.

Williams, O.:
—Pittsburgh's track repair organization permits no delay to service, *495.

Withington, Sidney:
—Economics of railroad electrification, 1008.
—Long electric trains not unusual, c86.

Wolfe, Jonathan:
—Track maintenance, 618.

Wood, C. V.:
—Tests show Springfield car to be quiet in operation, c822.

Z

Zimmerman, Jesse M.:
—Cast bars not drop forged, c698.
—Methods and equipment for efficient assembling of commutators, *117.
—Preventing flashovers, *489.
—Soldering of railway motor commutators, *323.
—Turning and slotting commutators, *694

READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX
Abbreviations: *Illustrated. c Communications.

PERSONAL INDEX

(with biographical notes)

A

Ackerman, Martin *313
Ackers, Deane 593
Adsit, Charles G. *361
Albert, J. E. 269
Albertson, Walter N. 401
Alexander, J. P. 932
Allen, F. W. 932
Ames, R. S. 187
Atkinson, Harry M. *99

B

Bagley, Arthur T. 1020
Bailey, Rufus W. *757
Baker, William H. 675
Baldwin, George J. 476
Ball, Albert 635
Bath, Albert 362
Baurhenn, Louis P. *100
Becht, Alfred J. 314
Bernhold, E. C. *1019
Blake, Henry W. 314
Bland, Arthur 721
Blunk, Adolf 634
Boiselle, Raymond 1066
Boschert, L. M. *759
Bourke, Lionel J. *64
Boyle, Samuel G. 1162
Bradley, Luke C. 313
Brainerd, Ezra 401
Brainerd, Ezra, Jr. 361
Brennan, Francis J. 556
Brewster, Neal 439
Bronsdon, M. H. 187
Brosseau, A. J. 844
Brown, H. H. *799
Brown, J. P. W. 750
Brown, Nelson T. 721
Brumbaugh, A. K. 847
Buffe, Fred G. *756
Bullen, Harry 400
Burchard, Anson Wood *227
Burke, Walter H. 438, *674
Butler, L. E. 844
Byers, W. S. *799

C

Campbell, Marcus L. *886
Carney, George J. 721
Carr, C. E. A. 147
Carr, Charles L. *757
Carson, I. R. *759
Chance, Col. Edwin M. 65
Cheever, R. R. 314
Clark, Edwin 401
Clark, Le Roy 1021
Clifford, George H. 438, *674
Cloyd, Hardy H. *758
Cobban, H. B. *1161
Coleman, Jilson J. 675
Collins, Emerson 269
Conway, Herbert E. *594
Cornell, J. D. *753
Corns, O. G. 146
Cortelyou, George B. 1019
Coult, Judge Joseph 1021
Cox, S. H. 401
Cummins, A. S. 146

D

Dalrymple, James *64,187
Davis, E. W. 1066
Day, Charles 65
Day, Henry S. 1161
Dean, Morton H. *594
Dierken, Joseph H. 313
Dixon, Alves 147
Doherty, Henry L. 549
Doran, Neal S. *758
Downs, W. Findlay 65
Druen, D. E. *759
Dye, Ernest R. 439

E

Elliott, J. Howard *1019
Ely, Edwin Samuel 439
Emanuel, Victor 362
Ernsberger, Earl R. *635

F

Fageol, F. R. 935
Farrand, Dudley 476
Fennell, D. L. 186, *758
Ferguson, George E. 439
Finlay, W. S. Jr. 845
Fischer, A. L. *187
Fitzpatrick, J. R. *1161
Foster, Joseph T. 1161
Foster, William W. *361
Frazee, W. M. 929
Freeman, Frank T. 594

G

Gadsby, G. M. 845
Gadsden, Philip H. 226, 844
Garvin, Ray W. 1020
Giles, Carl C. 885
Gnevo, T. F. 314
Goodwillie, David H. 401
Goucher, Edwin P. 313
Green, George R. *360
Greig, James Ashton 799
Grimes, E. G. 759
Groner, Powell C. *757

H

Hale, A. A. 1066
Hamerstrom, Burt 885
Hamilton, Fred 313
Hand, S. H. 401
Harder, J. A. *759
Harrington, Michael 593
Harvey, A. E. *758
Harvie, William J. 227
Heckman, Wallace 594
Heim, Joseph J. 594
Henry, Charles L. *845, 923
Holmes, Edward W. 759
Holstock, William E. 981
Huntington, Henry E. *981
Hustis, James H. 99, *186

I

In Memoriam 980
Irelan, S. B. 594
Ishida, Gitaro 353

J

James, G. W., Jr. 147
Jamieson, R. E. 314
Jenkins, Thomas M. 269

K

Kalp, Clyde F. 932
Kasemeier, A. L. *1019
Kelley, Edward F. *360
Kelsay, G. H. 1162
Kerwin, George J. *401
Kincade, C. A. *759
Kroll, Walter M. 593

L

Larkin, Robert C. *886
Lincoln, E. H. 932
Linn, Marshall G. 887
Littig, H. M. *1119
Luellen, Ross E. 119
Lundberg, Alfred J. *1020
Lynch, F. C. 65
Lynn, Albert M. 721

Mc

McAloney, W. H. 268
McGinley, John R. 476
McLellan, Ross L. 847

M

Mackinnon, Lachlan 400
MacRae, W. A. 269
Maltby, George E. 932
Macy, O. C. 362
Mariage, Pierre 227
Marshall, Andrew 593
May, Kenneth S. 99
Mehren, Edward J. 675
Meister, H. O. K. 315
Merrill, John J. 260
Meyer, Henry J. *268
Miles, Lovic P. 99
Miller, Thomas 634
Mills, Frank M. 721
Mitchell, H. L. 845
Mitten, Clarence E. *226
Mitten, Dr. A. A. *593
Moore, David H. 760
Myers, W. K. *1067, 1161

N

Nary, William T. 721
Neal, R. S. 759
Nelson, Major Samuel L. 676
Noah, B. G. *799
Nolan, Fred A. 226
Noonan, Victor T. 886

O

Oglebay, G. J. 475
O'Marie, P. 932
Orr, Harry A. 675

P

Pasche, William *844
Paterson, A. B. *844
Patterson, George E. 1162
Payette, Hazen J. 314
Persons, Niles *634
Powell, D. A. 314
Power, W. R. *475
Prout, Col. H. G. 269

R

Ready, Lester S. 361
Reed, Judge James H. *1162
Reid, Harry 146, 475, *1020
Reid, S. H. *1119
Ritchie, John A. 226
Robb, Russell 362
Robinson, Henry M. 637
Ross, W. E. *979
Rothery, George A. *100

S

Samuel, James W. 476
Sanders, Henry L. 932, *1019
Schoepf, W. Kesley 837, *887
Schreiber, Martin *100
Seiler, Paul W. *226
Sell, Claude L. *100
Semrad, Charles A. 674
Senter, R. T. *1067
Shappert, Frank W. 844
Siegmann, Richard 886
Sindeband, Maurice L. 597
Skelding, A. B. 675
Slingluff, Eugene 638
Sloan, Matthew S. 844
Smith, Charles E. 885
Smith, Del A. *438
Smith, Harry M. *759
Smith, Henry W. 227
Smith, Howard W. *759
Snodgrass, W. L. 721
Spencer, C. G. 675
Stanley, John J. 1021
Stearns, Russell B. 99, *634
Stenger, Ernest *1021
Stigall, Ernest E. *758
Storrs, Lucius S. 1020
Sullivan, Francis X. 594

T

Tate, H. W. *268
Taurman, A. *1090
Taylor, W. H. 146
Thayer, Edwin F. 99
Thorney, C. Edward 187
Towle, George C. 147
Townsend, Alfred S. *674
Tripp, Guy E. *1022
Tuohy, Herbert 799

V

Van Aradel, E. *475
Vaughan, R. M. 401
Victorson, E. E. 593

W

Walker, Edwin M. 65, *101
Walker, Samuel 269
Warner, Arthur T. *100
Weidman, C. O. 1066
Wells, Ray J. 1119
Welsh, G. W. *635
Weyman, H. E. *1066
Whiteside, E. B. 401
Whitney, Howard R. 360, *400
Whittemore, Joseph D. 360
Wills, Gerry S. 556
Wilmot, J. E. *556
Wilson, C. L. *556
Woolfolk, William G. *756
Wood, W. E. 313, *439
Woodcock, Floyd W. 65

Y

Young, Owen D. 1113, 1119

Z

Zimmermann, John E. .... [illegible]

READ THE INSTRUCTIONS AT THE BEGINNING OF THE INDEX
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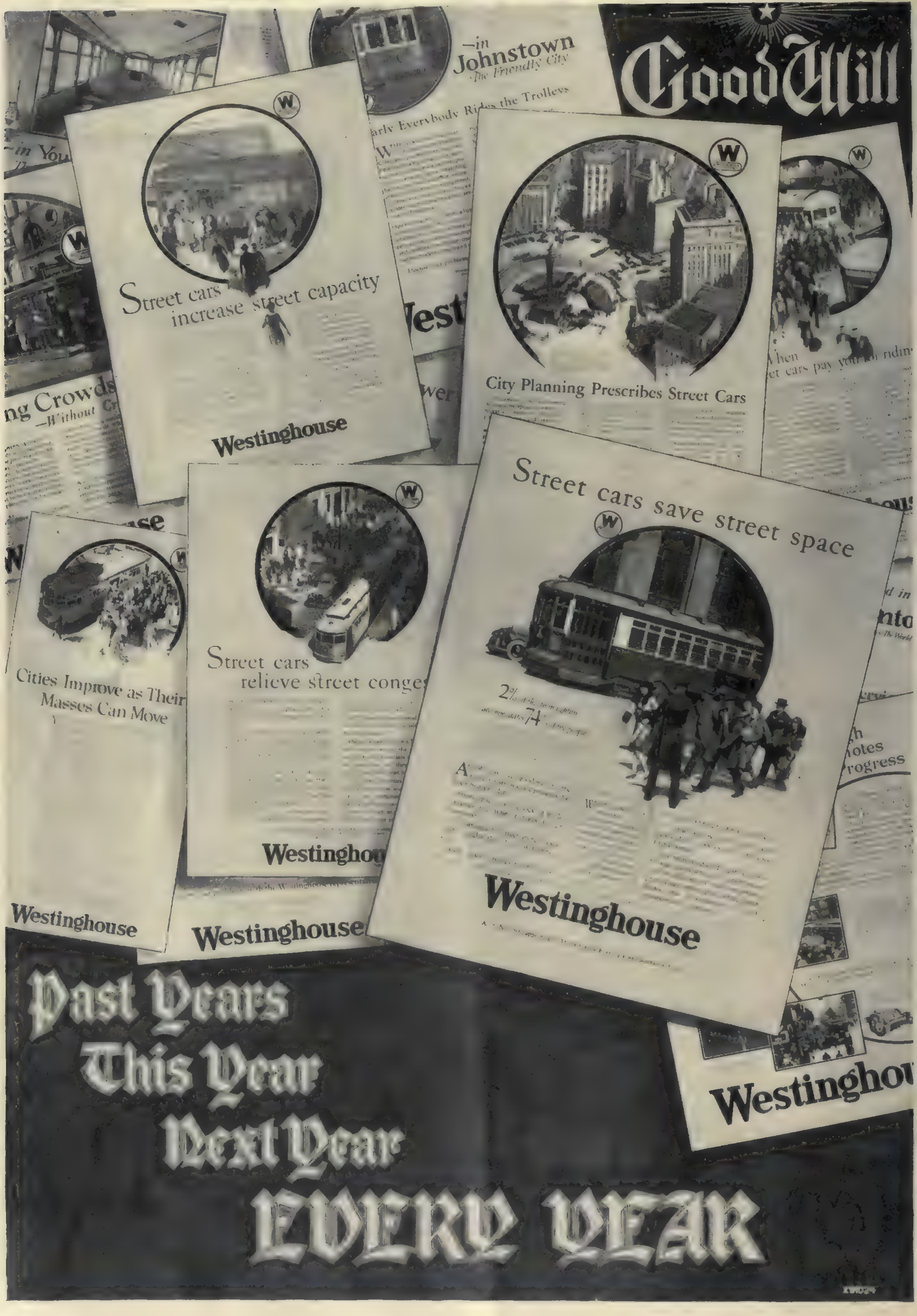
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CONTENTS

JANUARY 1, 1927

Editorials 1

Continued Progress Indicated for 1927 5

Industry shows increased riding in 1926 over 1925 despite a readjustment in operating conditions. Electric railway executives in all sections of the country predict further development during the coming year.

Chicago Surface Lines Operates 100 per Cent of Equipment During Holiday Rush 10

$263,830,000 Estimated for Equipment and Supplies in 1927 11

Some of Us Would Be Homesick in Heaven 13

BY G. J. MACMURRAY.

Such are the people who could read this account and not subscribe to the view that times change and we change with them. The plastic age in transportation appears to be at its height.

Increased Purchases Reflect Growing Interest in Car Improvement 20

Returns for the year show cumulative activity in purchases of surface and rapid transit passenger equipment. Beginning of comprehensive replacement program evidenced by increased scrapping rate. Buying of standard freight cars brings interurban totals above those for 1925.

Electric Railway Costs and Fares in 1926 28

BY ALBERT S. RICHEY.

While prices of wholesale commodities, electric railway operating materials and car fares have been stabilized at about 150 per cent of pre-war figures, electric railway wages and construction costs are more than double the 1913 level.

Total of New Securities Publicly Offered Was Small .31

Bus Development Continues Steadily 33

Number of electric railways engaged in bus operation increased approximately 20 per cent during 1926, while the number of buses increased more than 40 per cent. Much new route mileage added. Replacement of rail service comparatively slight. Large purchases made of other automotive equipment.

Fewer Electric Railways in Receivership 40

Mileage of properties defaulting have little more than half the mileage of those included in the 1925 record. Even including Chicago Railways the total is reduced. Twenty companies emerged from receivership and nine others were foreclosed and should come out in 1927.

Marked Increase in Track Activity During Year 43

Mileage of extensions and reconstruction in 1926 was 50 per cent greater than in 1925. Largest increase was in rebuilt interurban track. Less electrification of steam railroads occurred than during the preceding year. Track abandonments were lower. Total electrified mileage showed substantial gain.

Manufacturing Activity Should Continue at High Level 47

General economic conditions give no indication that a material recession is to be anticipated in 1927. Manufacturers in electric railway field believe transportation industry is now in position to realize on its opportunities.

The Readers' Forum 52

Association News and Discussion 53

News of the Industry 54

An Appreciation

WITH the beginning of a new year it is well for an individual or an industry to review the accomplishments of the old year and to lay plans for greater progress during the new. In doing this it is distinctly helpful to have available the record of the past and an outline of the conditions which may be expected in the future.

ELECTRIC RAILWAY JOURNAL devotes the first issue of each year to these purposes. It endeavors to put into the hands of electric railway and manufacturer executives a complete compilation of the industry's material progress and an estimate of what may be expected in the coming year, based on tentative budgets. Although it is something of an accomplishment to prepare these figures so that they include a full year's record in an issue dated Jan. 1, such timeliness would be impossible without the prompt and cordial co-operation of practically every electric railway in the country.

Statistical issues of the JOURNAL are unusual in that they represent responses from such a large percentage of the industry. The returns represent more than 95 per cent of the entire electrically operated mileage of the country. When it is realized that this information must be gathered in a very short period of time, the extent of the co-operation given by the industry and the interest taken in the issue becomes apparent.

The JOURNAL takes this opportunity of thanking those who have helped. It again pledges its faith in the electric railway industry and looks forward with confidence to the future. The entire staff joins in extending to its readers cordial greetings and best wishes for the coming year.

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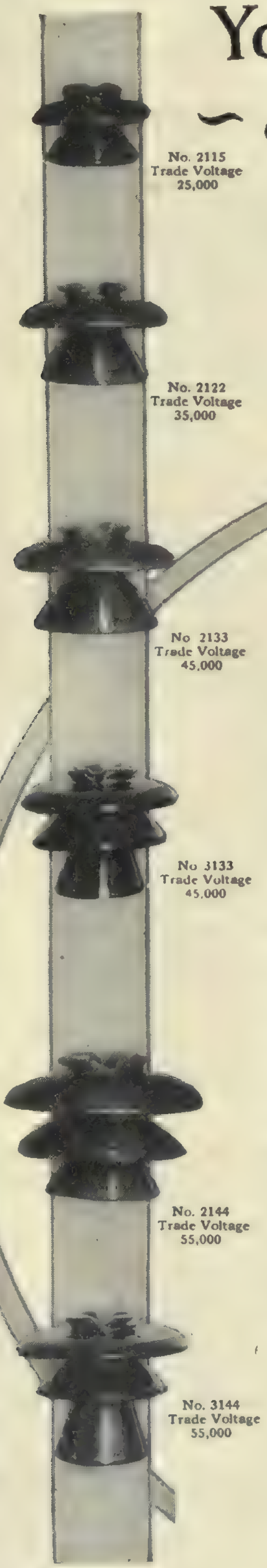

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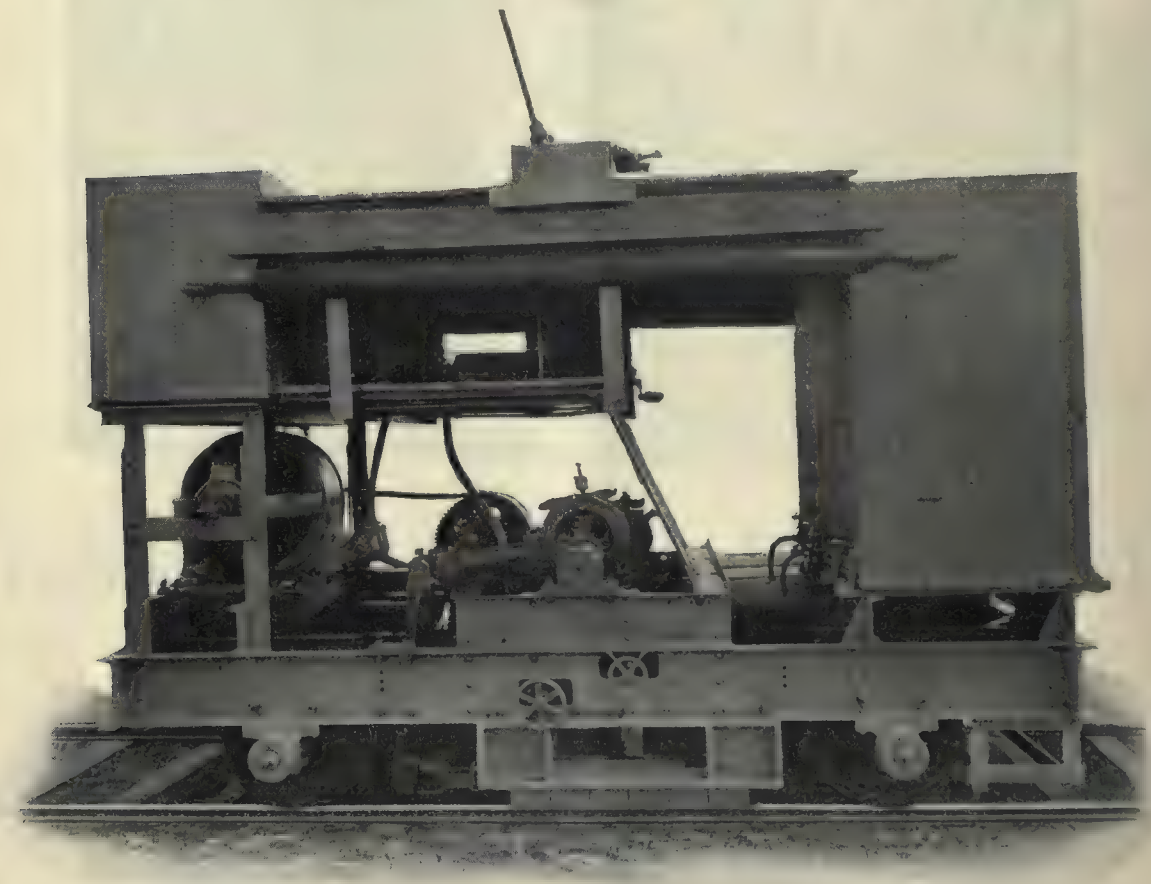

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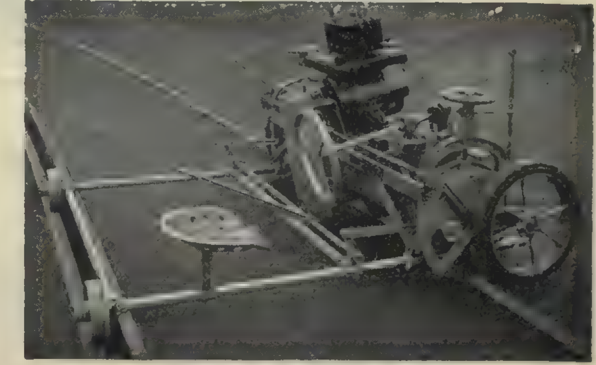

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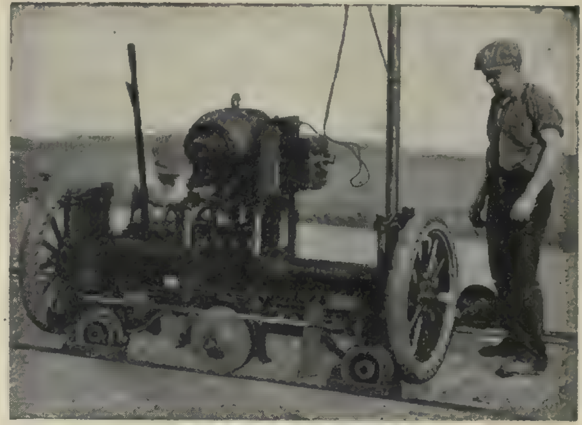

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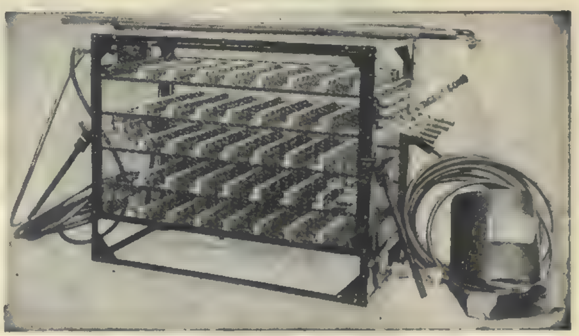

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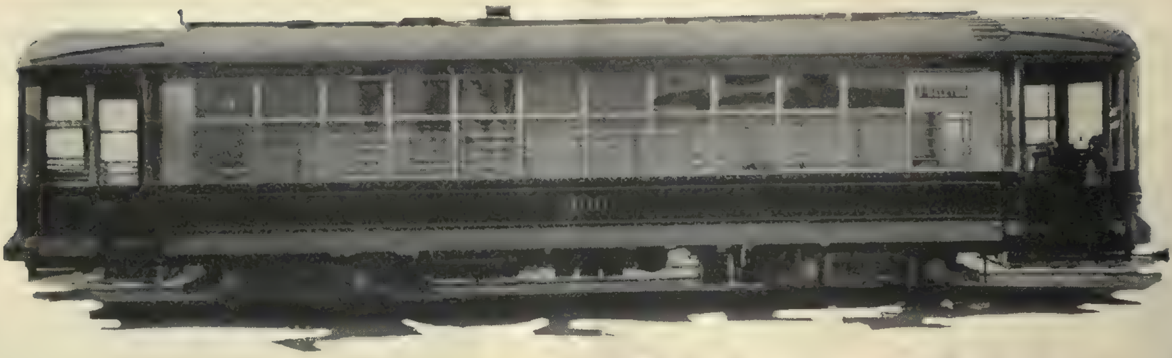

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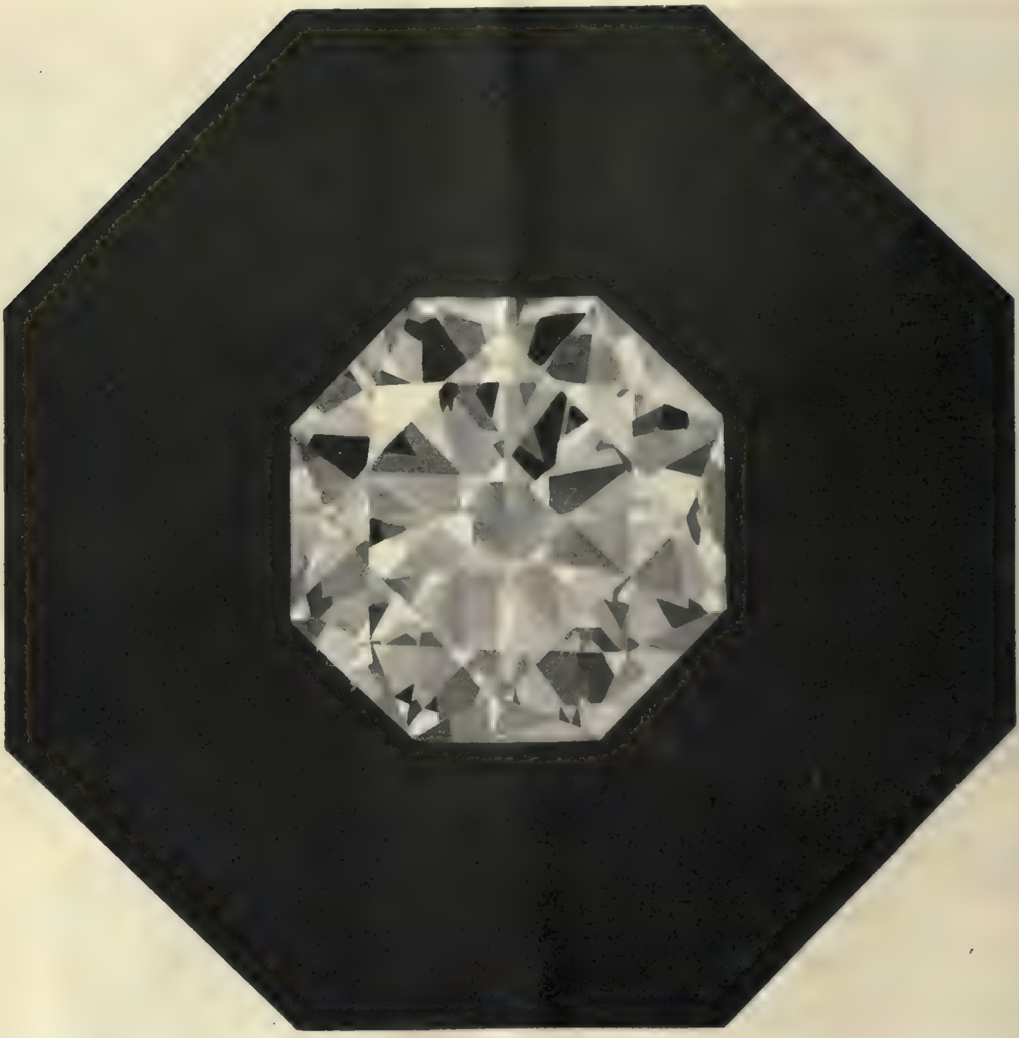

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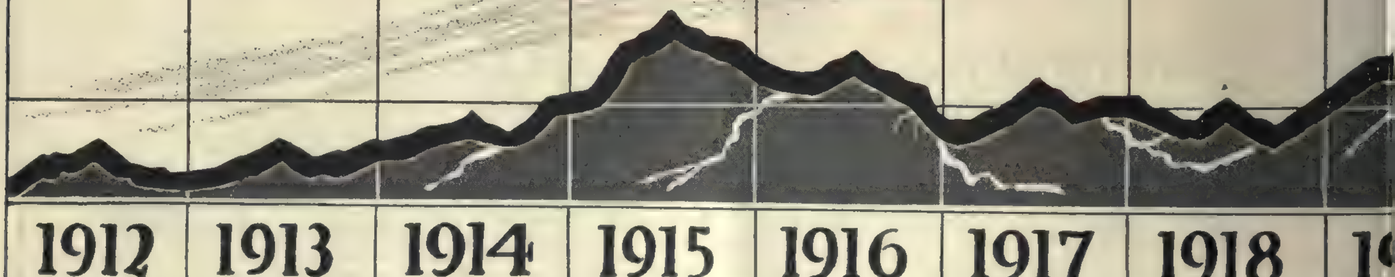

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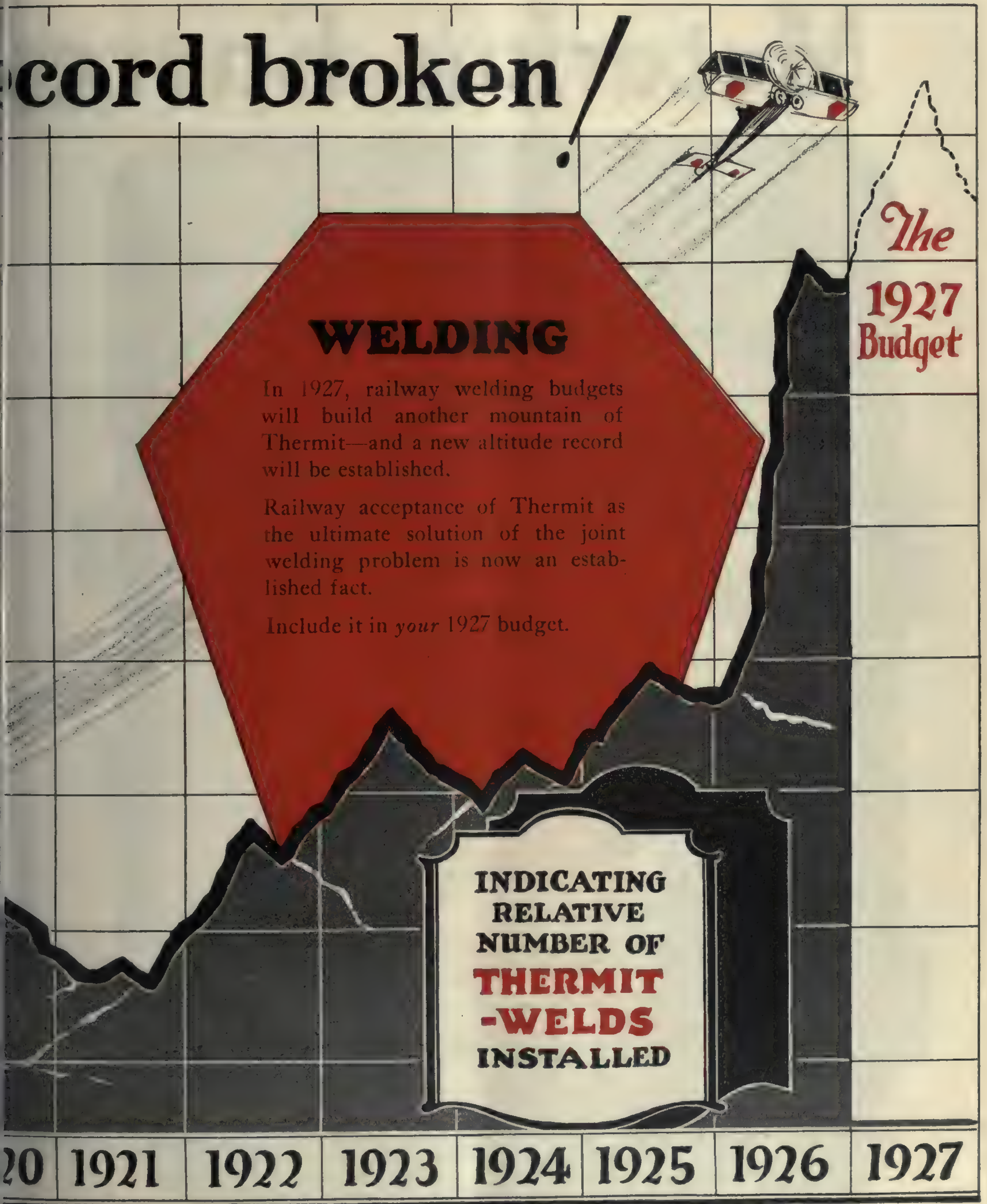

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We are serving the service

WE appreciate the responsibility a life time of service in the traction field has brought. Our thorough research in solving the problems that have come with each succeeding year, has given us a better understanding of the needs of the field and has endowed us with facilities and the knowledge to fulfill them to the utmost.

Our equipment covers a wide range in utility. Our installations are serving the service, affording a high degree of safety, minimizing physical exertion, and promoting economy in surface, subway, and "L" systems. The stipulation of Westinghouse equipment in your specifications for the new year will give us the opportunity to carry our service to you.

Westinghouse Variable Load Brakes in continuing their recognized service, are destined to play an important part in the traction program of the ensuing year. The safe, accelerated movement of traffic they afford makes for true economy.

Their characteristics and advantages are specifically outlined in our descriptive descriptive catalogue T-2045. A copy will be mailed at your request.

WESTINGHOUSE TRACTION BRAKE CO.

General Office and Works, WILMERDING, PA.

2207

WESTINGHOUSE TRACTION BRAKES

East

Installation of the New York, New Haven and Hartford Railroad Co.

West

Installation of the Grand Rapids Street Railway Co.

Bates Steel Poles not only give superior service and longer life, but their sturdy, trim, and unobtrusive appearance impresses the public favorably, and inspires confidence in the transportation company as a sound enterprise.

Bates Poles Outlive the Bond Issues That Buy Them

INTERNATIONAL
STANDARD ELECTRIC CORP.
General Export Distributors

SAMUEL BROWN, LTD., *New Zealand*
JOST ENGINEERING CO., LTD., *India*

BATES-TRUSS
Expanded
MADE ONLY BY

Bates Expanded Steel Truss Co.
Sales, Engineering and Executive Offices
EAST CHICAGO, INDIANA

American BROWN BOVERI

Statistics, based on costs, are now written history for the past year.

American Brown Boveri, during this period, was an influence for the first time in the reduction of costs in substation practice.

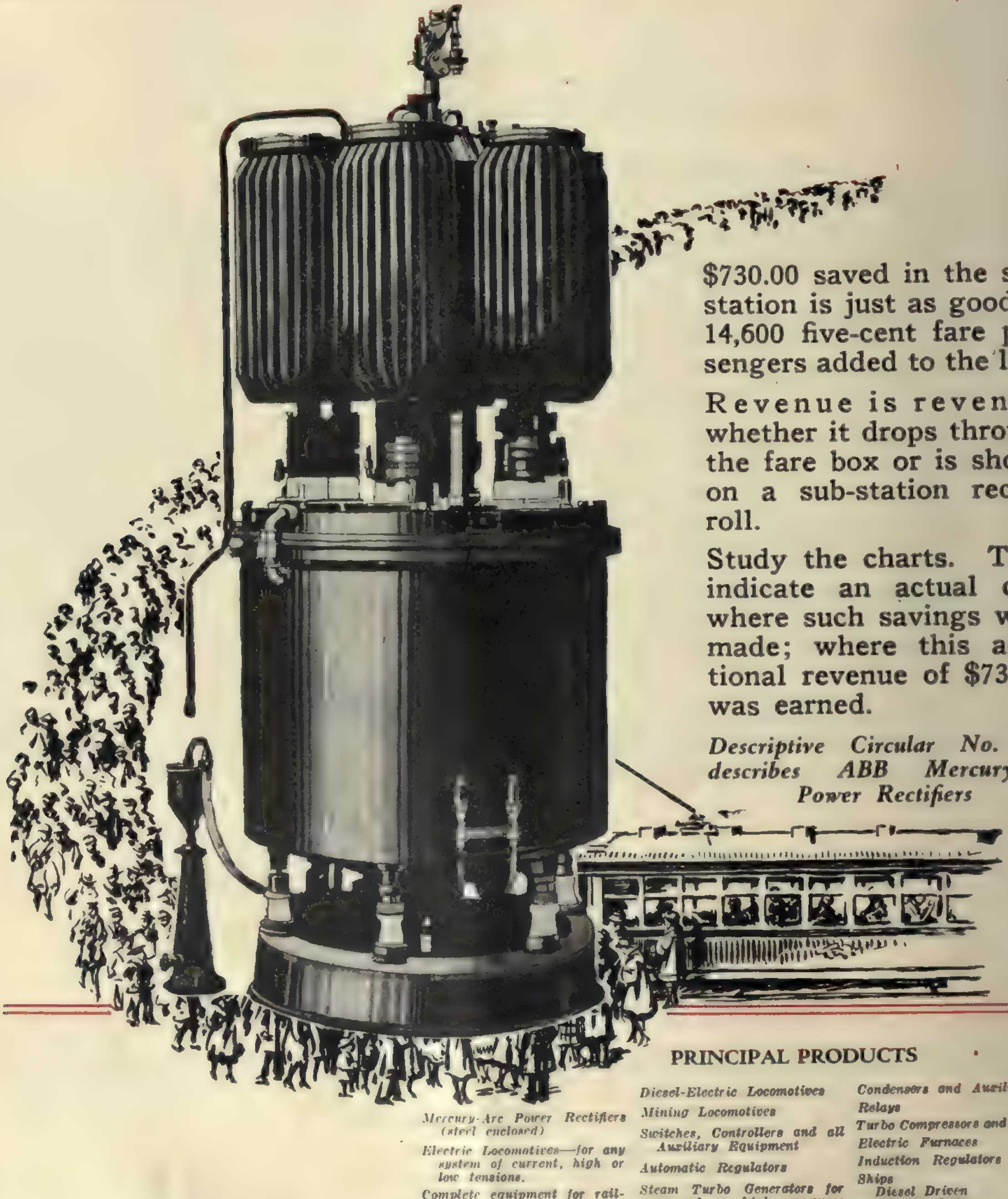
Several installations of American Brown Boveri Mercury-Arc Power Rectifiers were put into service early enough in the year to have their economies show in these statistics.

They will write a greater record in the year to come.

continued—

ABB

American
BROWN
BOVERI



$730.00 saved in the sub-station is just as good as 14,600 five-cent fare passengers added to the line.

Revenue is revenue, whether it drops through the fare box or is shown on a sub-station record roll.

Study the charts. They indicate an actual case where such savings were made; where this additional revenue of $730.00 was earned.

Descriptive Circular No. 301 describes ABB Mercury-Arc Power Rectifiers

PRINCIPAL PRODUCTS

- *Mercury-Arc Power Rectifiers (steel enclosed)*
- *Electric Locomotives—for any system of current, high or low tensions.*
- *Complete equipment for railway electrification*
- *Rotary Converters*
- *Motor Generators*
- *Diesel-Electric Locomotives*
- *Mining Locomotives*
- *Switches, Controllers and all Auxiliary Equipment*
- *Automatic Regulators*
- *Steam Turbo Generators for normal or high pressures and superheats*
- *Oil Switches*
- *Condensers and Auxiliaries*
- *Relays*
- *Turbo Compressors and Blowers*
- *Electric Furnaces*
- *Induction Regulators*
- *Ships*
  - *Diesel Driven*
  - *Turbine Driven*
  - *Electrical Driven*
- *Structural Steel Fabrication*

ABB

Mercury-Arc Power Rectifiers

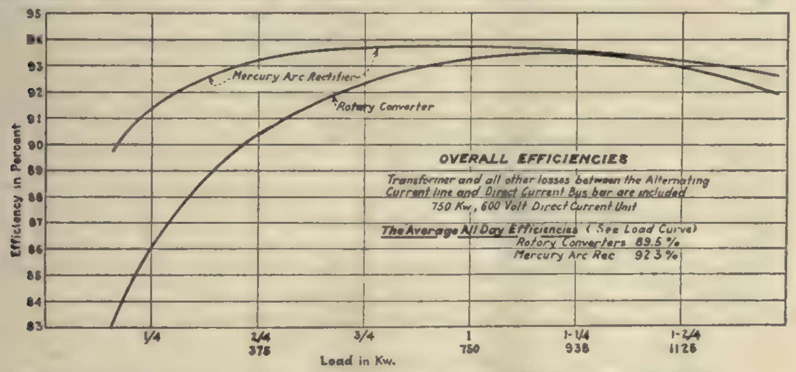
REVENUE IS REVENUE—
whether it is dropped in the fare box or is saved in the substation

With a BROWN BOVERI MERCURY ARC RECTIFIER, characterized by unusually high efficiency at partial loads, the Average Converting Losses are, at extremely Low Load Factor, *cut down tremendously,* even at Rail Voltages as low as 600 V.

Below is shown what can be done in an Actual Case by the use of Mercury Arc Rectifiers. The reference is to an Interurban Railroad in one of the Eastern States. The substation rating is 750 Kw.-H., 600 V. The part of a record roll reproduced on this page shows the usual output over a period of six hours.

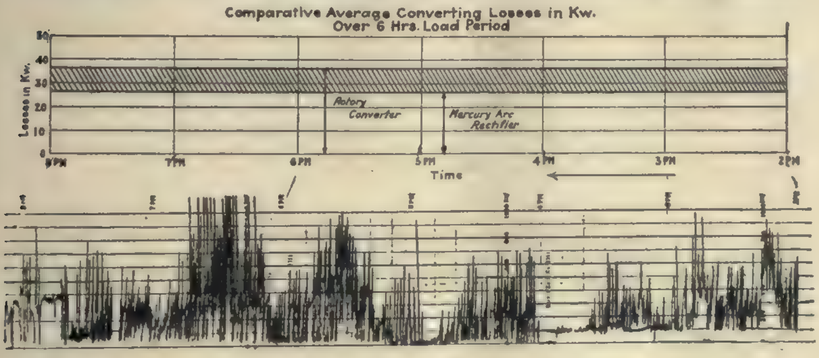
The AVERAGE ALL DAY OVERALL EFFICIENCY was found to be:

for Rotary Converters.............. 89.5%
for Mercury Arc Rectifiers.......... 92.3%



The saving obtained in six hours (represented by the shaded area) when extended over a 20-hr. day, amounts to MORE THAN 200 KW.-H., or, at 1c. per Kw.-H., THE ANNUAL SAVING effected is $730.00, which is the INTEREST on MORE THAN $10,000.00.

In addition to the power saving, the maintenance cost will be less than half as much as with rotary converters.



AMERICAN
BROWN BOVERI

ABB

American BROWN BOVERI

Distinguishing features of
American Brown Boveri
Mercury-Arc Power Rectifiers

1. Efficiency high over the whole working range.
2. Simple operation and minimum attention.
3. No synchronizing.
4. Very high momentary overload capacity and insensibility to short circuits.
5. Negligible maintenance.
6. Low weight. No special foundations.
7. Noiseless and vibrationless operation, consequently rectifier substations can be erected in densely populated localities.
8. New substations need only be of light construction. In many cases old houses can be converted, while the plant can often be erected in places that could not be considered for rotating machinery.

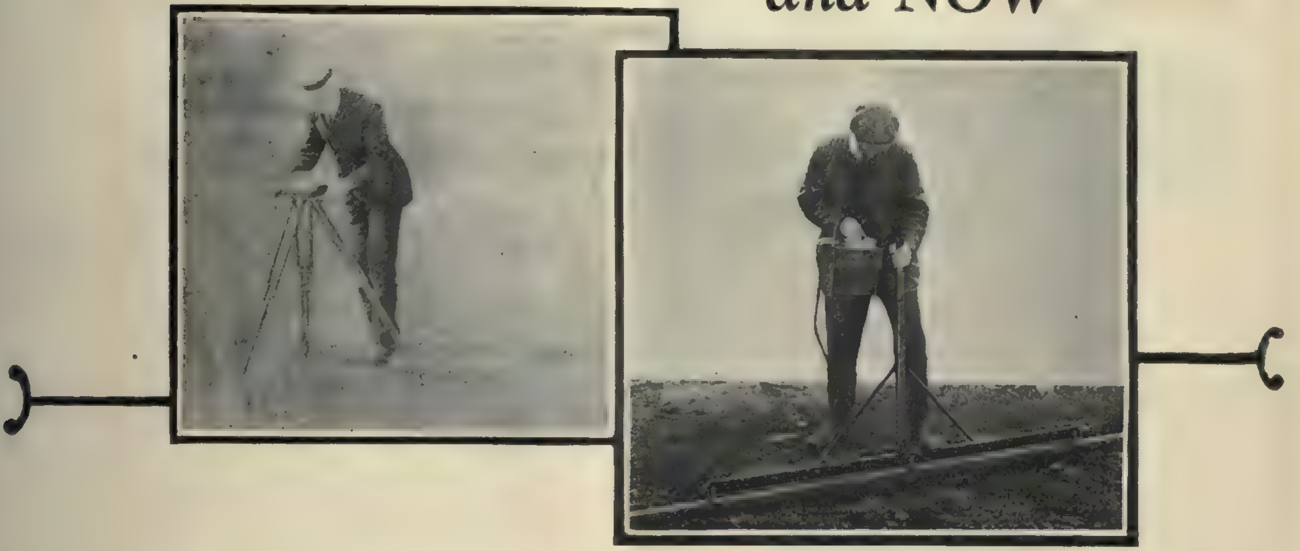
MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA 1927

American Brown Boveri Electric Corporation
165 Broadway, New York, N. Y. Camden, New Jersey
922 Witherspoon Bldg., Philadelphia 842 Summer St., Boston 230 South Clark Street, Chicago

AMERICAN BROWN BOVERI

BOND TESTING

Two decades ago *and NOW*



Then a tester went around with a twin type milli-voltmeter, tripod and contact bar. Setting up was a big job. If there was no current flowing in the rail he had to call it a day. Moving from one bond to the next with all this equipment was a slow process.

Can you guess how many bonds a man tested per day under *those* conditions?

Nowadays all the tester does is to place the BBT Bond Tester strap around his neck, place the contact bar on the rail and read the resistance of the bond direct in units of feet of rail. If no current is flowing in the rail he presses a button with his foot and one No. 6 dry cell, mounted on the contact bar, supplies the necessary current in the rail for an accurate reading. Picking up the contact bar, he moves quickly from bond to bond. You can realize how many bonds *this* man can test in one day.

The early Whitney twin type milli-voltmeter gave way many years ago to the Roller-Smith SBT direct reading Bond Tester and, more recently, to the Roller-Smith BBT high sensibility type Bond Tester which are the standard the world over.

The Type BBT Bond Tester has many times the sensitivity of the most sensitive bond tester heretofore made. Every man who is *any* way interested in bond testing should know all about this instrument. Fill in and forward the coupon below and a copy of Bulletin No. G-200 will be sent you promptly. Or, better still, get in touch with the R-S office nearest you. There is one in every principal city.

ROLLER-SMITH COMPANY
Electrical Measuring and Protective Apparatus

Main Office:
2140 Woolworth Bldg., NEW YORK

Works:
Bethlehem, Pennsylvania

Offices in principal cities in U. S. A. and Canada
Representatives in Australia, Cuba and Japan

ROLLER-SMITH CO.,
2140 Woolworth Bldg., New York, N. Y.

Please send Bulletin G-200.

Name .... City .... State ....

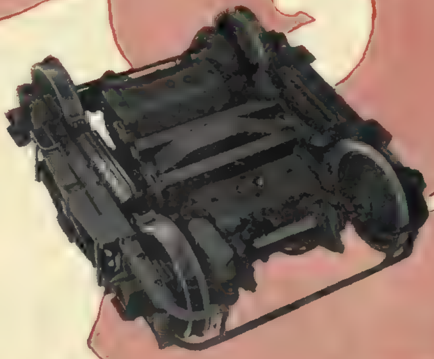
Company .... Position ....

BALANCE

BALANCED
Lightweight **CARS**

BALANCED TRUCKS

BALANCED BRAKING
Duplex Air an
Magnetic



-and a BALANCED
LOCOMOTIVE
especially designed
for Electric Railway
Freight Service

Lightweight DESIGN

A clean cut policy *for 1927!*

No less than twelve years ago this company went definitely on record as an advocate of light weight cars.

Such an idea was radically new at the time. Its application presented many problems of construction never before encountered. But the fundamental advantages of the lightweight car could not be denied. And its development has never lacked the attention of progressively minded men in all branches of the industry.

Our own experience, as pioneers in this movement, has shown definitely that *lightweight in itself* is not enough. There must be primarily a sound engineering balance of units for the service demanded. Then, when the car is built in accordance with modern ideas of lightweight construction, the result will be a unit in which weight has been reduced even below the average "lightweight" standard, with a perfect balance of the whole for the service conditions to be met, and without sacrificing the service efficiency of any single part.

This in short is the principle of Balanced Design — lightweight car building reduced to a simple, workable formula, and applied with such success that every installation made to date has been a substantial success.

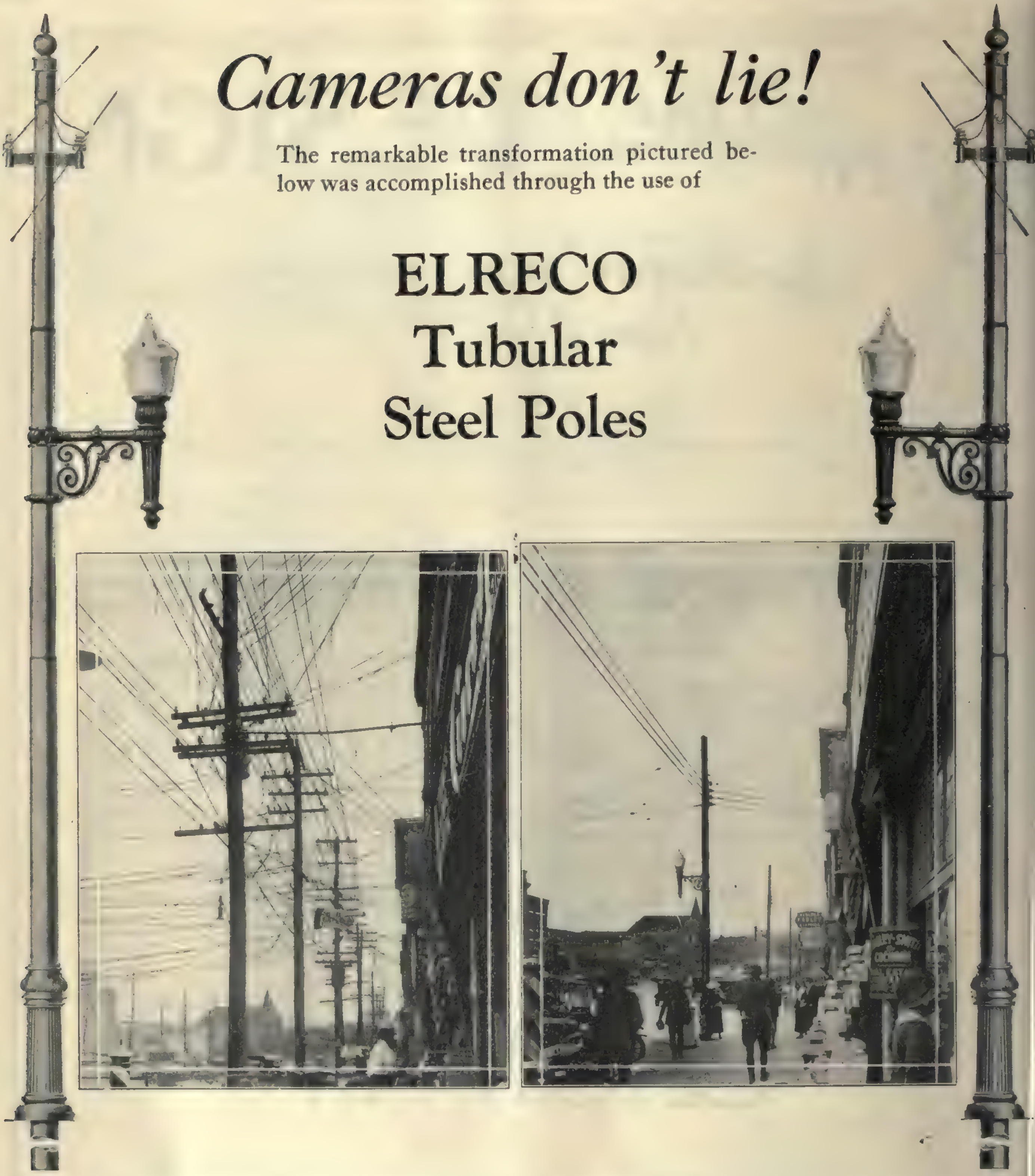
On this basis our policy for 1927 can be stated simply and directly— Modern Cars, built in accordance with the principle of BALANCED DESIGN, *light* in weight, *proved* in performance, *accurately fitted* to service requirements and sold as *complete units, designed and built under one competent control.*

May we discuss the matter with you in greater detail?

THE CINCINNATI CAR COMPANY
CINCINNATI, OHIO

CINCINNATI
New
CARS

A step ahead of the modern trend



Cameras don't lie!

The remarkable transformation pictured below was accomplished through the use of

ELRECO Tubular Steel Poles

Some *proven* advantages of Elreco Tubular Steel Poles:

Greater Civic Pride, meaning better public relations. Fewer poles needed. One pole supports: trolley span wires, commercial and feeder lines and acts as the ornamental lighting bracket and fixture. Economy—cost and maintenance. No necessity for installation of separate lamp standards and lighting equipment with underground feeders. Revenue obtained from City for lighting fixtures takes care of all purchase and installation expense.

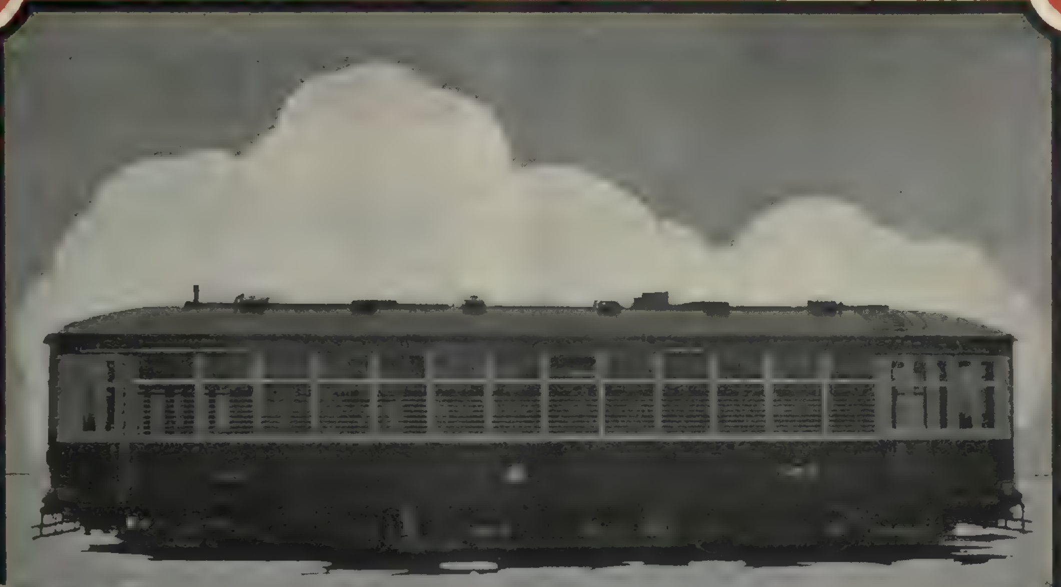
Some Elreco Features:

"Wire Lock" joint—prevents any independent movement of the pole section.
Tubular shape—no angles, pockets or corners to retain moisture and invite corrosion.
Occupies smallest ground area.
Resists strain in all directions equally well.
Unexcelled ease in painting.
Lightest in weight for all around strength.
Lowest cost—maintenance and depreciation.

Write for illustrated catalogs.

The Electric Railway Equipment Co., Cincinnati, Ohio

New York City: 30 Church St.



In the designing of the St. Louis EIB trucks, small number of parts, concentration on balance, lightness, and quiet, smooth operation with adequate strength has produced a combination of these qualities decidedly in advance of previous attainments in street railway operation, and resulting in improved riding qualities.

On the forty new Milwaukee Cars, ordinary bearings are used, but a feature of this truck is the equalizers which are so arranged as to permit the use of roller bearings at any time by merely changing the journal boxes. This is the first type of truck so constructed and a distinct advance in truck engineering.

they're MODERN *from every point of view....*

DISCRIMINATING Milwaukeeans will be quick to notice and appreciate the unusual features of the new *Modern* cars shipped to their city from the "Quality Shops" of the St. Louis Car Company during December. The outward appearance alone is indicative of the advance in quality represented by these new cars.

Entering the car, one notices the convenient placing of the doors, the wide aisles, and St. Louis spring seats upholstered in dark grey Kemi-Suede. There are six indirect dome lighting fixtures; and steel panels conceal the air piping and controllers at each end. These cars combine comfort and convenience with attractive appearance to an unusual degree. Double end—one-man operation is a feature of Milwaukee's new car. To the right of the motorman there are double doors, one as an exit and the other as an entrance, which provide easy and rapid loading and unloading. The right hand door at the rear is equipped with a step treadle for use as an additional exit.

Cars are equipped with quadruple 25-horsepower motors.

built by—

St. Louis Car Co.

Quality Cars

Representative

Chicago Surface Lines latest type one man-two man car.

Chicago and Joliet Electric Railway's lightweight interurban car. One man, single end operation.

Interior of Chicago and Joliet Electric Ry. Car, showing individual plush and leather seats, and smoking compartment.

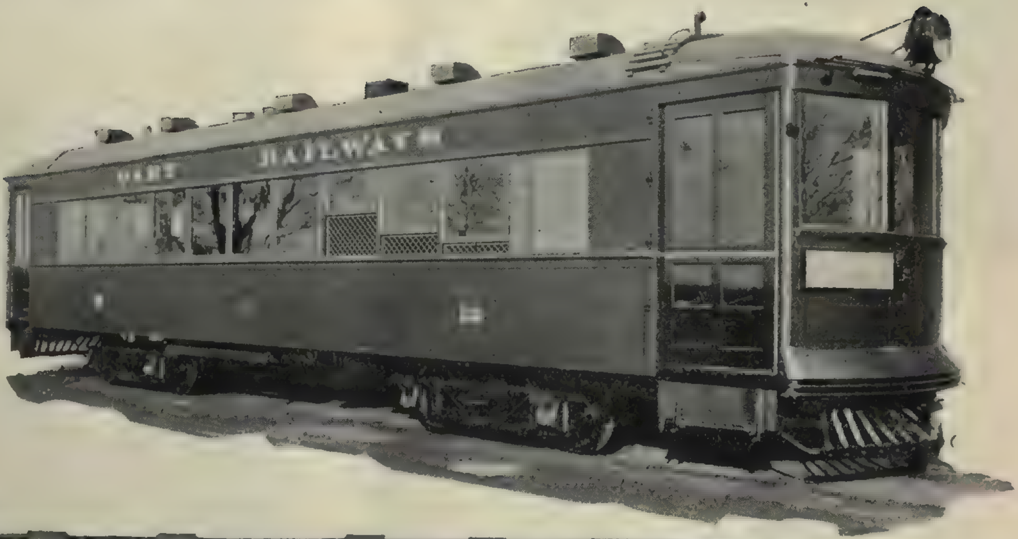
Cummings No. 62 truck having exceptional easy and quiet riding qualities.

The illustrations show some of the modern cars built during the past year by

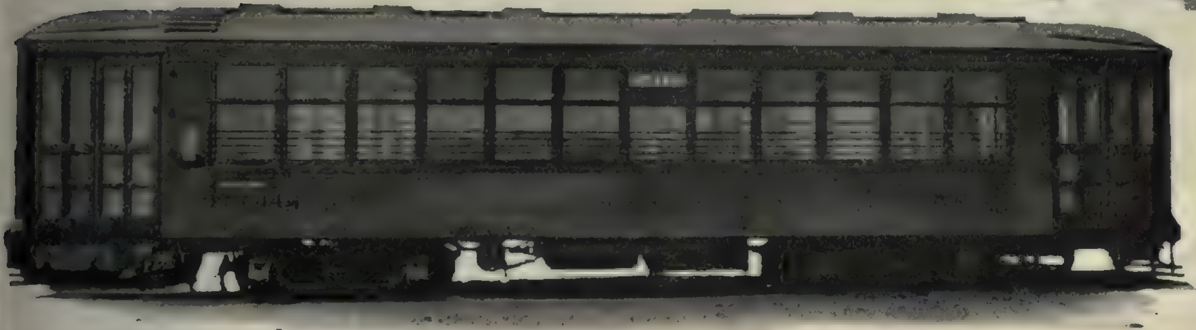
Cummings Car

Successor to McGuire-Cummings Manufacturi

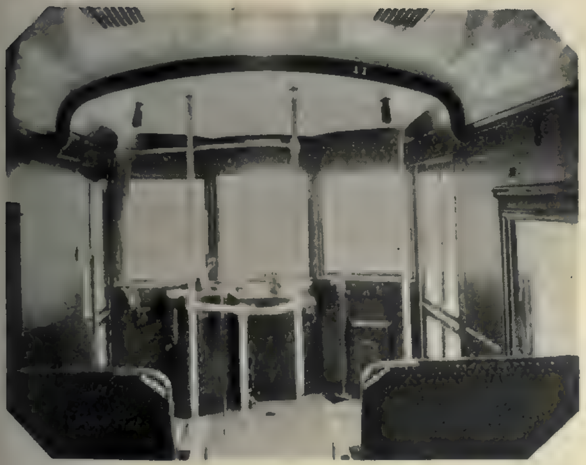
Modern Cars



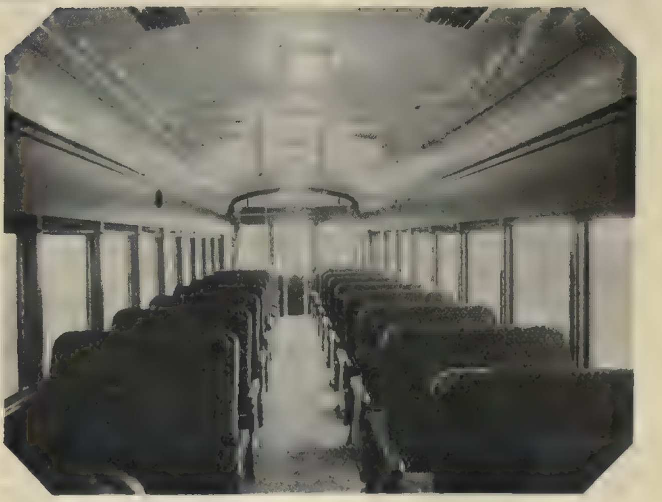
One man, double end cars of the latest type used in Gary, Indiana, on their city, suburban and interurban lines.



Cars of this type built for the Chicago & West Towns Railway and other properties.



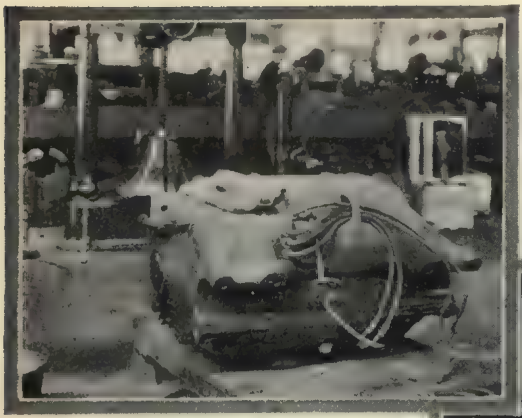
Showing the platform arrangement on the Gary Cars, with all pipes enclosed in cabinet and head lining in vestibule.



The interior of Gary's new cars combine comfort with pleasing appearance.

And Coach Co.

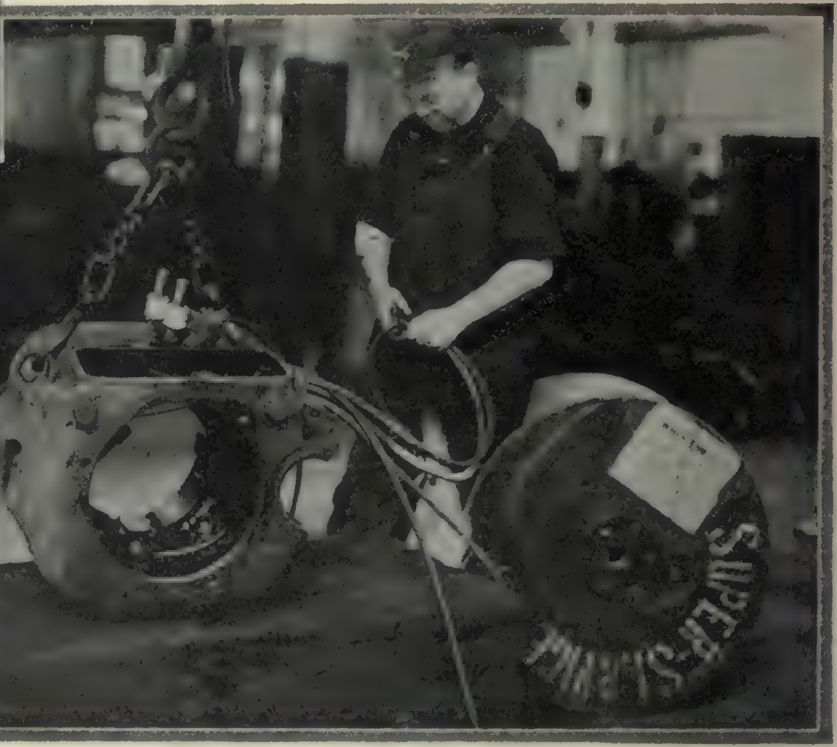
ompany, 111 W. Monroe Street, Chicago, Illinois



Super Service stands the gaff in all kinds of weather.

Super Service Single Conductor Cable can be furnished with a paper separator, without additional cost.

For outside motor leads used in connecting the controller with the motor box.



Flexible Waterproof Tough ~

The Ideal Cable for outside motor leads

First cost isn't half so important in a motor lead as the ultimate cost. After you've taped and repaired again and again you begin to realize the real value of a good cable for this job.

You need a cable that is flexible enough to stand the bending of the constantly moving trucks, that is absolutely waterproof, and tough enough to stand the daily abuse that open car wires receive.

Super Service Cables fit that description perfectly. They are vulcanized in steel molds under tons of pressure —a patented process that can be used for no other wire. The result is perfectly centered conductors in an outer jacket of rubber that is flexible, water and acid proof, and tougher than you ever thought a cord could be.

If you want to keep motor lead repairs down, get a reel of Super Service today, and renew with Super Service as fast as the old wires wear out.

ROME WIRE COMPANY

Mills and Executive Offices: Rome, N. Y.

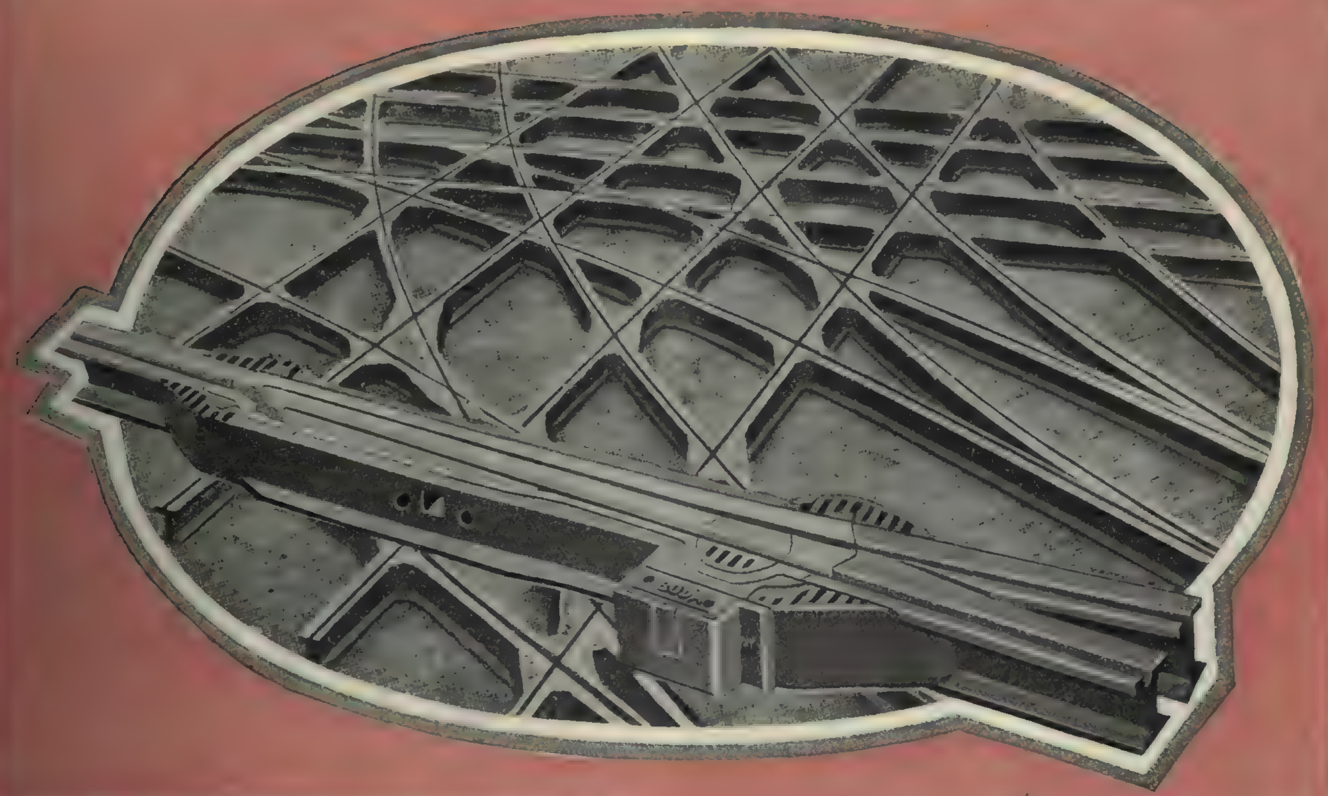
Diamond Branch: Buffalo, N. Y.

New York—50 Church Street
Detroit—25 Parsons Street
Boston—Little Building
Chicago—14 E. Jackson Blvd.
Cleveland—1200 West 9th Street
Los Angeles—J. G. Pomeroy Co., 336 Azusa Street
San Francisco—J. G. Pomeroy Co., 960 Folsom St.

SUPER SERVICE
CORDS *and* CABLES

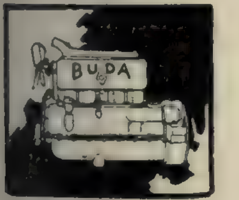
3554

A ROME WIRE PRODUCT



Track and Bonding Drill

Track Jack



Bus Engines

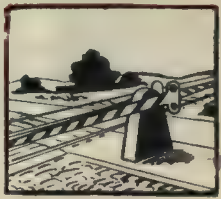
Motor Car

SERVICE is the one unfailing test of quality in trackwork and equipment. Buda trackwork and equipment has been meeting this test for forty-five years—and is meeting it today. Buda is always an assurance of quality and service.

Let Buda serve you.

THE BUDA COMPANY
HARVEY (Chicago Suburb), ILL.

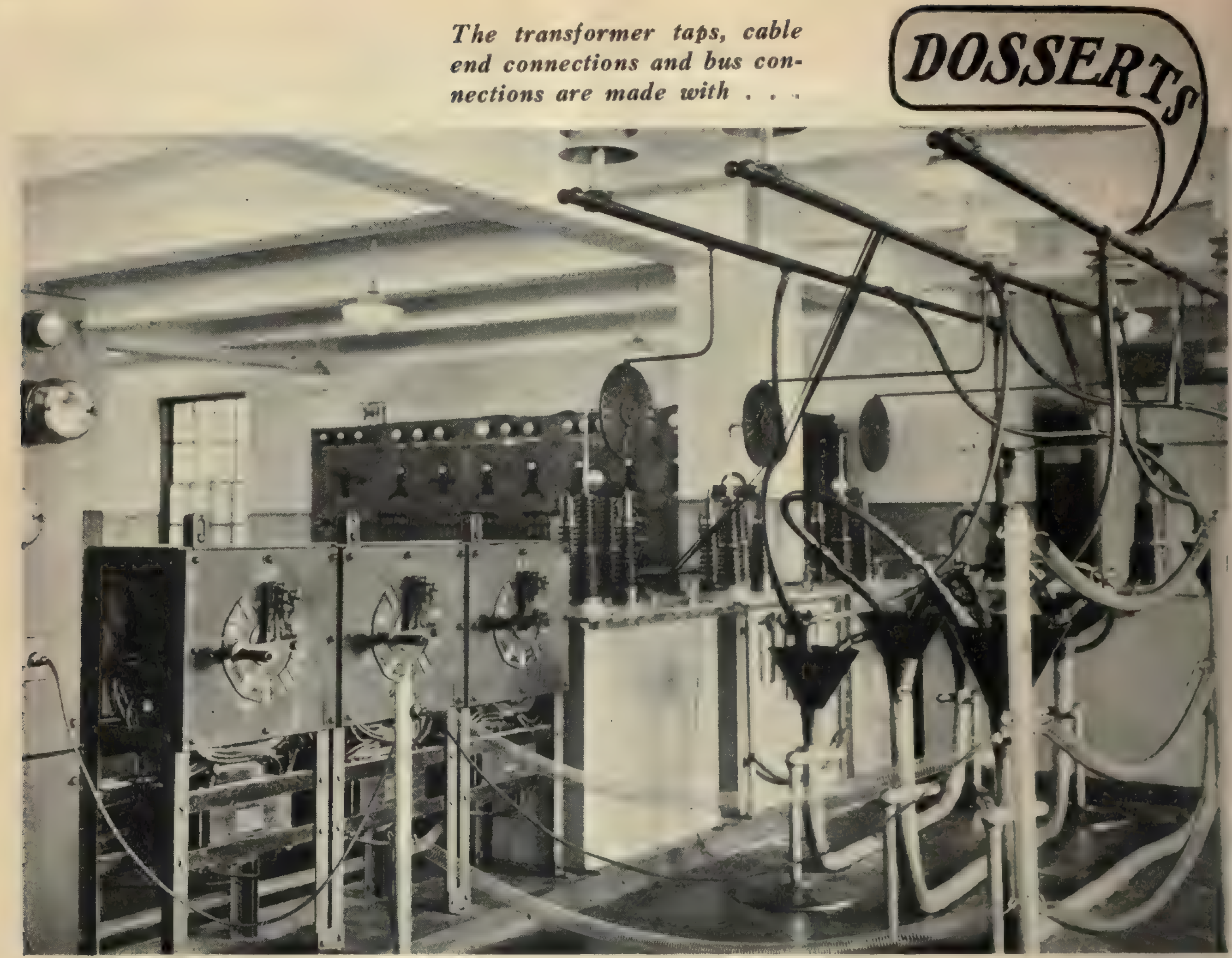
BUDA
ESTABLISHED
1881


Crossing Gates

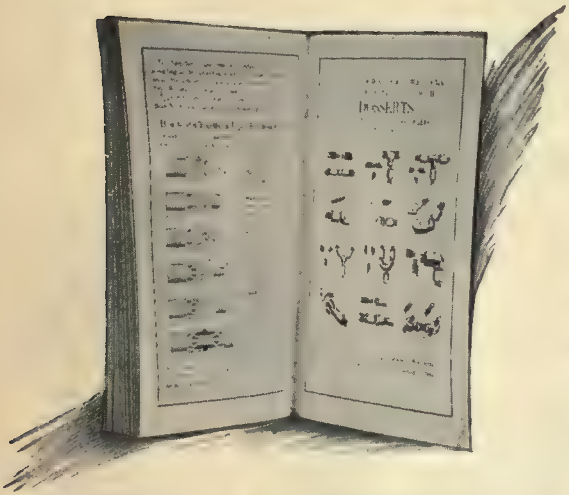
Buda Hubron Earth Drill

On the BUDA HUBRON Earth Drill some companies report cutting their pole hole digging to 1/6 their former cost by hand.

The transformer taps, cable end connections and bus connections are made with . . .



—in the new research laboratory of a large Eastern Utility



In any indoor or outdoor station, in any distribution or industrial wiring job where branches are connected to mains, where straightaway or T's or Y's or deadend connections are modern. . . . . . DOSSERTS.

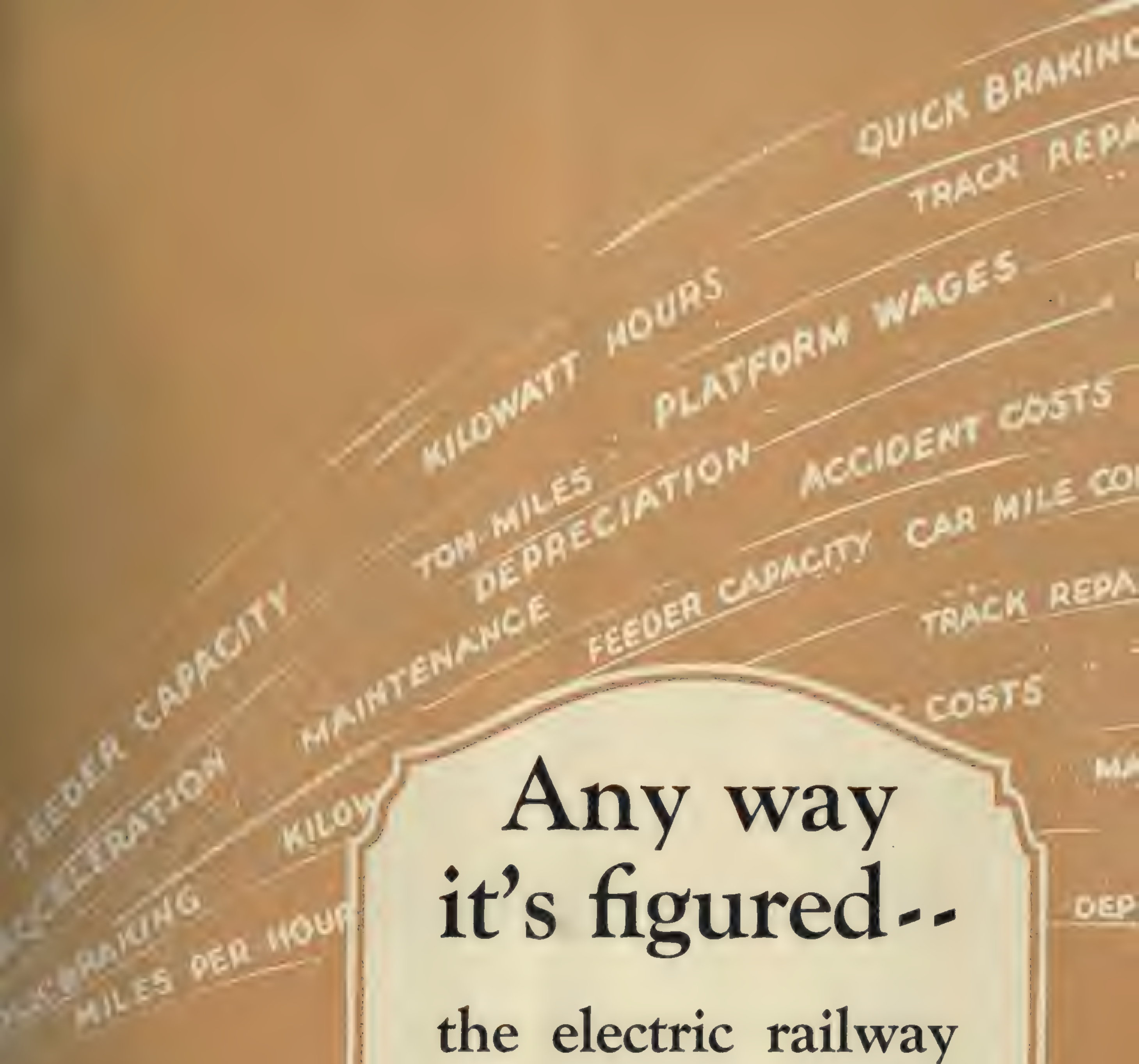
The new edition of the DOSSERT catalog is just off the press.

Many time-saving kinks toward better connections are shown in this 25th yearbook.

It's free.

DOSSERT & COMPANY, H. B. LOGAN, *President*, 242 West 41st St., New York

DOSSERTS



Any way it's figured--

the electric railway industry is paying for modern cars whether it gets them or not--

QUICK BRAKI

AC

—the railways

A difference of

10¢

per car mile

operating cost is

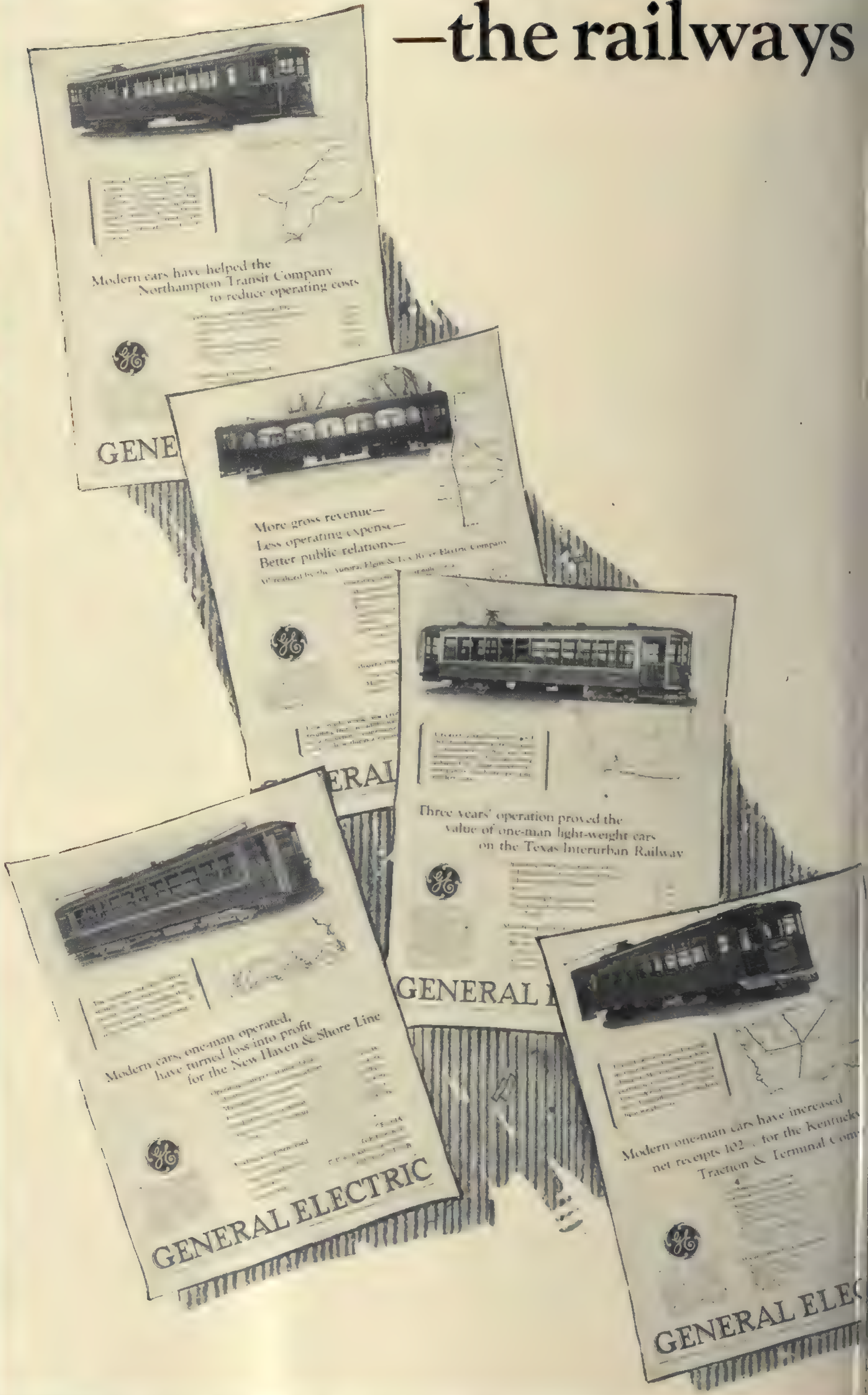
$3000

per car per year

ACCELERATION

QUICK REPAIRS

MILES PER HOUR



Modern cars have helped the Northampton Transit Company to reduce operating costs

GENE

More gross revenue—
Less operating expense—
Better public relations—

ERAL

Three years' operation proved the value of one-man light-weight cars on the Texas Interurban Railway

GENERAL

Modern cars, one-man operated, have turned loss into profit for the New Haven & Shore Line

GENERAL ELECTRIC

Modern one-man cars have increased net receipts 102 for the Kentuck Traction & Terminal Com

GENERAL ELEC

GENERAL

g modern cars find they do pay!

NO LONGER is the industry asked to accept the value of modernization on faith. Reliable operating data from the records of dozens of companies have proved beyond a shadow of doubt that new car investments yield a gilt-edged return.

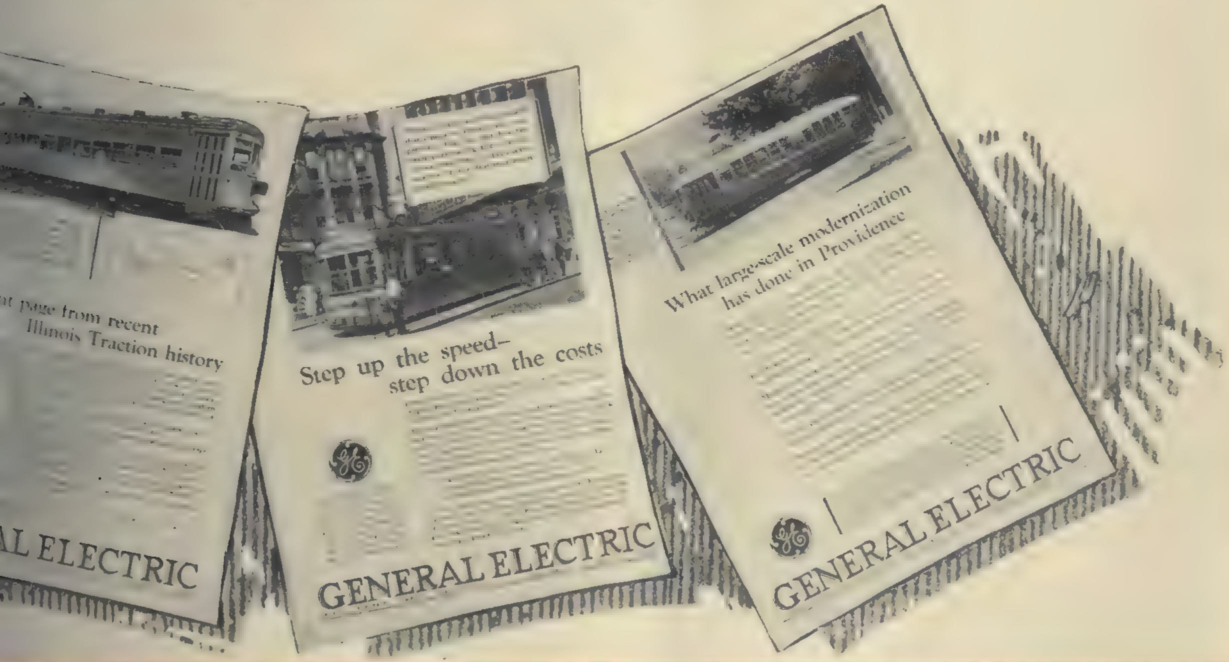
A study of the records of 20 properties operating approximately 5000 cars reveals a saving of at least 10 cents per car mile as a direct result of modernization. In addition, we find such results as a 30% increase in patronage and material increases in schedule speeds.

Figures quoted below show that this anticipated saving of 10 cents per car mile is conservative. Yet it amounts to $3000 per year per car in average operation. And it can be made the *rule* rather than the exception, throughout the industry, with continued efficient use of modern cars—and thoroughly modern car equipment.

TOTAL OPERATING EXPENSES—CENTS PER CAR MILE

	BEFORE	AFTER
Buffalo & Erie Railway	37.50	28.80
New Haven & Shore Line Railway	43.04	19.48
Aurora, Elgin & Fox River Elect. Co.	42.30	26.61
Interstate Street Railway	37.75	26.10
Kentucky Traction & Terminal Co.	30.50	20.00
Averages	38.22	24.20
Reduction	14.02 Cents	

Actual operating results on five typical roads after a thorough modernization of rolling stock.


t page from recent Illinois Traction history
L ELECTRIC
Step up the speed— step down the costs
GENERAL ELECTRIC
What large-scale modernization has done in Providence
GENERAL ELECTRIC

ELECTRIC

You PAY for modern cars whether you get them or not

The modern standard has been set—very definitely. A saving of $3000 per car per year in operating cost has been proved entirely possible under average conditions.

If, then, you do not modernize, you will be spending the cost of new cars as a direct tax on the continued use of obsolete equipment. Certainly a very poor policy when the way to prosperity is so clearly charted!

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CIT

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

Volume 69 New York, Saturday, January 1, 1927 *Number* 1

The New Year Is Bright with Opportunity

RECORDS of passengers carried, miles of track constructed and reconstructed, cars purchased, buses operated, receiverships lifted and other measuring sticks of the industry's progress all show a successful year during 1926. There is no need here to quote the figures. They are given in detail in the articles printed in this issue. It is in the underlying conditions which have produced the favorable results of 1926 and the tendencies which indicate the prospects for the future that primary interest lies.

Reviewing the developments of the past year, a number of high spots stand out. The electric railway industry has begun to interpret into concrete railway policies the abstract discussion of changed conditions which it is called upon to meet. "Transportation merchandising" has been translated from words into action. "Favorable public relations" has come to be recognized as springing primarily from improvement of the character as well as the adequacy of the service rendered. The attitude of employees toward the company's customers has been found to be a reflection in a large measure of the attitude of the management toward the employees and the attention given to their proper training for the job. All of these things may be grouped as the human or psychological factors affecting the industry's performance. The record would not be complete without pointing out that there has been a continuing tendency for the few faint-hearted and precedent-bound executives who lacked faith in their own business to give way to those with greater vision, courage and enthusiasm.

MODERNIZATION has taken on a more definite meaning. There has developed a widespread conviction that an industry which presents a down at the heels appearance may expect to be treated as a failure and that the public has no interest in its difficulties and problems, unless that interest is won by making the service so attractive as to arouse public enthusiasm. There has been a growing realization that, though a franchise may grant a theoretical monopoly, common-carrier transportation is actually in competition with individually owned vehicles to such an extent as to require the application of all the principles and methods used in any other competitive business. Realization of this has developed a rapidly growing interest in the replacement of obsolete equipment and the rebuilding of rough and poorly aligned track. This has been accompanied by a persistent demand for car improvements and developments designed to make the rail-borne vehicle quieter, more attractive and more economical. Here there is still a wide open opportunity for the exercise of ingenuity by manufacturers.

WHILE there is general agreement among transportation men on the need for co-ordination of transportation service, progress in the application of this principle on a broad basis has been slow. The process of fitting together the bus and the car has been confused to an extent by the tendency to compare the performance of new and modern automotive vehicles with poorly maintained cars that have seen many years of service.

In special party, sightseeing and touring service an attractive field for new bus business has opened up on a basis which offers attractive profit. In the field of scheduled service approximating in comfort and speed the private automobile, and at rates considerably above those charged for mass transportation service, there seem to be almost untouched prospects for profitable application of buses on a large scale.

THERE is progress toward broader thinking on the local transportation problem in large cities. In that transportation men have in the past overlooked the relation between the destiny of any one company and the entire transportation situation in a community, they have not played as active a part in helping to point the way toward sound community policies as they may be expected to do in the future.

All signs point toward continued progress and improvement. The industry's future depends on the imagination, courage and public spirit displayed by those charged with the responsibility of directing the destinies of the various properties. Based on the added experience of 1926, the new year opens bright with promise and opportunity.

National Prosperity Is Reflected in Results of Electric Railway Operations

PROSPERITY for the country at large is linked closely with prosperity in the electric railway industry. Transportation of the working population plays the largest part in the railway gross revenues. Hence the continuation of a high rate of production in the various industrial communities, with corresponding large payrolls, has had a direct effect in swelling the revenues of the transportation companies.

It is too early yet to tell the exact status of operations in 1926, or to make a final comparison with the year previous. Replies to inquiries by this paper received from a number of executives of electric railway properties, large and small, over a wide territorial range are almost unanimous in stating that the results of the past year will equal if not slightly exceed those for 1925. The earlier year was a very good one as regards traffic and revenue. It is quite possible that 1926 will go down in history as the greatest traffic year the industry has known up to this time.

As to 1927, opinion seems to be that conditions which have obtained for the past year will be continued. Many railway operators are planning for increased traffic. Economies are also becoming effective, so that the spread between income and outgo is becoming greater. In this way prosperity in the transportation industry is showing a steady growth.

While a large share of the new business recorded for the past year has come as a result of the general business prosperity, other contributing factors are extensions of service, both by street cars and by buses. But not an inconsiderable portion of the increase in business has been the direct result of salesmanship. Those roads which have given the greatest attention to the provision of better facilities and have made the public conscious of the fact are the ones which have gone ahead most rapidly. Individual expressions show that some managements are keeping in mind all the possibilities for selling service to the public. It is only in so far as the managements have adopted this attitude that the railways have obtained the full measure of success that is possible in this day of almost universal prosperity.

Renewed Activity in Track Construction Reflects Improved Condition of Industry

FOR the third successive year additions to the electrified trackage of the country exceeded by a substantial margin the mileage abandoned. Extensions to city and interurban lines approximated in amount the same as in 1925. Steam railroad mileage electrified during the year was somewhat less than the year before. Abandonments, however, showed a slight decrease. As a result, there was a definite net gain in the total miles of electrically operated track. Coupled with this was a large increase in the amount of track rebuilt. Altogether the mileage of new construction and reconstruction totaled about 12 per cent more than that of the preceding year. This quickened activity in trackwork furnishes encouraging evidence of the sound condition of the electric railway industry.

There was a substantial increase not only in the amount of trackwork done but there was also a corresponding gain in the number of companies reporting track improvements. Particularly significant was the activity of the interurban companies. More new interurban track was built in 1926 than was built the year before and the mileage of reconstructions was more than twice as great. City track reconstruction in 1926 exceeded that done in 1925 by about 100 miles, though city extensions lagged somewhat behind.

Figures for steam railroad electrification scarcely do justice to the situation actually existing. While the mileage of track on which electric operation replaced steam operation during the year was considerably less than in 1925, the number of new electrification projects undertaken was impressive. Included among these are the plans of the Pennsylvania and Great Northern Railroads, totaling several hundred track-miles.

From statistics covering the development of the electric railway industry over a period of many years, it appears that the total of electrified mileage in this country and Canada reached a maximum of about 46,000 in 1920. In that and the following three years the mileage of abandonments exceeded that of additions made, a net loss of some 500 miles of track occurring during this period. In 1924 the losses and gains practically balanced each other. Since that time there has been a distinct upward trend, amounting to about 250 miles net gain, so that today the total electrified mileage remains only slightly below the maximum figure.

Budget Forecast Indicates Constancy of Industry's Purchasing Power

NOTWITHSTANDING 1926 purchases dropped behind those of recent years, the forecast for 1927 promises an increase of nearly $31,000,000 over the year just closed. This estimate and forecast, presented elsewhere in this issue, is based on an extended survey of railway companies that ELECTRIC RAILWAY JOURNAL conducts each year. Questionnaires were sent this year to a much larger list, including properties of all sizes, so that the figures now presented represent returns received from fully 50 per cent of the electric railway mileage in the United States and Canada.

Estimates of new expenditures, principally for betterments, indicate the urge to improve the service. Approximately $55,000,000 is the budget for cars alone, an increase of $15,000,000 over that spent in 1926. Most of this is for new cars and the balance for the modernization of old equipment. Whether or not this healthy increase materializes and whether it will continue in a satisfactory manner in future years depends in no small measure on the ability of the manufacturers of cars to develop equipment sufficiently far advanced to offer a revenue building appeal that will be attractive to the operators.

Some comment may be caused by the slight decrease of bus purchases. It should be borne in mind, however, that the use of this vehicle by railways has had a rapid growth in recent years and it is only natural to expect that the use of the bus will settle down to a normal basis commensurate with its economic usefulness. There seems little reason to doubt that bus purchases will continue to show a general tendency upward, due to an increasing use as well as to replacement. This latter factor will, of course, not make itself evident for several years, as few of the buses recently placed in operation by railways are yet due for retirement.

That the industry has continued to purchase well over $100,000,000 of new track, equipment and power facilities and that this year it plans to spend $145,000,000 are interesting in the light of its poor credit standing. Much of the money has undoubtedly been acquired through channels of joint utility company financing, but no small part has been drawn from transportation earnings. This latter process is only another indication of the inherent strength of the industry.

The railways are making a noteworthy struggle, harassed as they are on one hand by an impaired credit and political bickerings, though encouraged on the other by a growing appreciation of the basic necessity of local transportation. A constancy of expenditures in the light of these facts, all too well known, cannot be taken otherwise than as an encouraging sign.

Financial Factors of 1926 Were Favorable

COMPARISONS often are odious. It is an old statement. Still the desire is irresistible, particularly at this time of the year, to indulge in just this kind of thing. On its face the amount of new financing by the railways seems infinitesimal compared with that done in other industries, but the total of such financing so reported does not tell the whole story, else the expenditure of $233,000,000 by the electric railways in 1926 for maintenance, materials and supplies, including new cars, would be inexplicable. But it isn't. The industry is spending not lavishly, perhaps, but it is spending. Much of this money is coming out of earnings, a tendency that seems automatically to strengthen the financial structures of the companies that resort to this means. One company that comes to mind deliberately withheld dividends from its stockholders for a period of several years rather than to borrow at the prevailing rates, and later capitalized these expenditures and returned the company to a dividend-paying basis after the physical improvements thought to be necessary had been made. These improvements have certainly paid their way.

So it is with the matter of the purchase of new cars. New cars are being bought, not perhaps to the degree that the increased earning power of such equipment would seem to justify, particularly when it has been so firmly established that modern cars will save enough in operation to pay not only their carrying charges, but leave a substantial balance for the amortization of superseded equipment. But new cars are being bought. So are buses. Many of the utility properties include railway, light and even gas in a combination that makes it quite impossible to segregate the amounts of money applied to each of these activities. The JOURNAL account does not contemplate any attempt to summarize the utility total, but the amount of securities placed publicly in 1926 on combined properties reported by *Electrical World* is $1,149,000,000.

Of the financial condition of the railways as a whole there are many signs that are hopeful. If the reader will turn to the diagram of receiverships elsewhere in this issue and follow the black line, he will see at once that the peak of receiverships as regards mileage was reached in 1919, with the 1926 amount lower than in 1925. The improvement has, in short, been progressive. This is likewise true of the record of receivers' sales. The record of receivership for 1926 was unusually propitious. True, the Chicago Railways found it expedient to seek the protection of the courts, but there has never been any question about the earning capacity of the road. Gradually but surely the amount of securities in default is being decreased. That is significant.

Increasing Use of the Bus Shows Satisfaction with Past Performance

MORE and more each year the bus is finding its logical place in the local transportation system. Progress in the development of bus operation by electric railways continued during 1926 at approximately the same rate as during the record-breaking year 1925. The number of buses operated by these companies increased from 5,358 on the first of January a year ago to 7,749 at the present time, a gain of more than 40 per cent. During this period the number of electric railways engaged in bus operation increased from 280 to 333, a gain of approximately 20 per cent.

To a noteworthy extent the development has taken the form of expansion of activities by railways that were operating buses a year ago. This is shown clearly by the fact that the increase in the number of vehicles has been proportionately much greater than the increase in the number of companies operating them. So it would appear that experience has proved the bus to be a valuable addition to the equipment of the electric railways.

Bus route extensions made by the railways during the year just ended were impressive in amount, totaling approximately 2,650 miles, exclusive of sightseeing service. This figure is considerably in excess of that for the record-breaking year 1925. By far the greater part of the new route mileage represents the establishment of additional facilities where none formerly existed. Rail service was superseded by bus service on only some 215 miles of track. From this it appears that the bus is finding its own place in the transportation field. To a slight extent it has replaced the car where it was found to be a more economical vehicle. To a far greater extent, however, it is being used to provide an entirely new service.

Sound Transportation Policies Cannot Be Built on Expediency

NEW YORK and Chicago are the high spots in the country-wide struggle for city transportation readjustment. Their very size and complexity merely magnify the problem encountered on a smaller scale in several other cities. So far, there has been little progress in either city toward a workable plan for providing an adequate transportation system that may grow and expand with the increasing needs of the community. In the meantime, jockeying for position on the part of the several interested parties has resulted in a number of moves which, though they have attracted much attention, are not in the direction of establishing broad principles of transportation settlement. In both cities the difficulty of arriving at a fundamental solution is increased, and the baffling tangle of interests is made even more complicated by injection of the bus into the already complex situation.

In Chicago a boulevard bus system was permitted to grow up during a period when the other transportation companies failed to recognize seriously the possibilities of this new vehicle. In New York the bus system, at one time a part of the existing transportation properties, was permitted to get into other hands. In both cities the present bus line owners are now alert to protect and promote their own interests in any general transportation program. Few would question their right to discharge this responsibility to their stockholders.

Both in Chicago and New York the situation is complicated by opposing corporate interests, personalities and politics. Since a company with its money invested in operating bus lines is obviously concerned in any city-wide plan, there is occasion for little surprise at moves which are made with the intention of strengthening the bus position in general transportation negotiation. But in the heat of the struggle brought about by the necessities and exigencies of such situations there is danger of creating popular misunderstanding which is unfair to existing transportation units, and dangerous to the entire local transportation industry.

That there is a proper and economic place for rapid transit, surface cars, buses operating as street cars on rubber tires, and buses furnishing a preferred form of service at distinctly higher rates of fare has gradually become the accepted conception of a comprehensive co-ordinated transportation service. Expedient though it may be at the moment, because one particular form of transportation is relatively free of legal restrictions and tax burdens carried by other agencies, it is obviously not in the best interests of the public or the community to abandon the principle that each vehicle should be used in the character of service for which it is best fitted. The full co-operation of all transportation men is needed in advocating and pressing the principles of city-wide co-ordination, flexible franchises and fares, and relief from unfair direct and indirect tax burdens. Whenever a concession is made from this sound industry policy in an attempt to secure an advantage for a particular property, establishment of transportation on a secure business basis receives a setback.

The effort to maneuver into a stronger position led to the purchase of the New York Railways Company by the Fifth Avenue Coach Company. Since this is to be followed by rehabilitation of the major rail lines and substitution of buses only where they are found to be more suitable, the consolidation seems a move in the right direction. But in Chicago, where the situation, though equally complicated, is set up in a slightly different way, the same people recently proposed to substitute buses for all of the cars on what is probably the finest street railway system in the world. As a move in the interest of the existing bus investment this, of course, may be a well-timed stroke to assure adequate consideration of the bus in any proposed general solution. But looking at the proposal from the standpoint of the community's interest and the industry's future it offers at best a mere expedient to circumvent the present need for franchise legislation in Illinois.

The local transportation industry is suffering today from the adoption in the past of just such short-sighted expedients, which though they accomplished the immediate object of their proponents have left the industry and its ultimate security holders buried in a mass of public ill will and self-created operating shackles. Distortion of the transportation picture in the eyes of the public for the immediate profit of a given interested group is not in the best interest of the public itself or the transportation industry as a whole.

There is no question but that the bus will ultimately play an important part in the establishment of a unified and co-ordinated transportation system both in New York and Chicago—and in every other large city as well. But every effort to extend the use of any particular agency beyond the field in which it can give the most economical and efficient service on a basis comparable with other existing agencies leads to confusion of thought and waste of the ultimate rider's money. In the fact that a proposal to substitute buses for all the street railway lines in a city like Chicago presupposes that buses in mass transportation service may remain immune to the burdens carried by other agencies it is short-sighted thinking. In the fact that it creates the impression that buses can be successfully operated as mass transportation vehicles at the present level of street car rates it is dangerous to the future of the bus itself. In that it is based on the contention that a 100-passenger vehicle free to weave about on a pavement creates less congestion than one confined to rails it sows the seed for future difficulty and public ill will. Such a proposal handicaps the formation of a properly-balanced and co-ordinated transportation system—one which may be operated on a basis to provide adequate transportation to the public and a reasonable return to the investor, in the future as well as the present.

Steady Progress Reflected by Car Purchase Statistics

PASSENGER car purchases during 1926 showed an increase of 184 over 1925. This was due entirely to cars bought for city service, as the number of interurban passenger cars was 11 less than for 1925. The gain in purchases of city passenger cars amounted to 195, divided 157 for rapid transit service and 38 for surface transportation. Although the number of interurban passenger cars bought in 1926 was slightly less than that for 1925, still the total number of interurban cars purchased was 33 greater, due to the number of freight cars bought.

A number of points are outstanding from the statistics of car purchases during 1926: The total of cars and electric locomotives was 13½ per cent greater than for the preceding year, although less than half the number for either 1923 or 1924. The number of city surface passenger cars bought is approximately the same as for 1925, while the number of rapid transit motor cars is about double. Interurban passenger cars total nearly the same as in the previous year, while the freight cars are 28 per cent more. Electric locomotives exceeded by 28 per cent the orders for 1925, the number bought being the greatest since 1923.

Cars built for operation by one man or two men are the most popular for city service, as they were the year before, the number of this type being nearly 45 per cent of the total passenger cars. Orders for multiple-body articulated cars were placed by three companies, with a total of 89 units.

Light-weight construction is an essential feature of all the new car designs, and greater attention than ever before has been given to the improvement of appearance and to the provisions for greater comfort and convenience of passengers. With respect to power, four-motor equipments were supplied for the majority of the double-truck cars.

An interesting feature is that the number of cars junked during the year is almost as great as the number purchased, showing the attention that has been given to the replacement of obsolete equipment with modern.

Continued Progress Indicated for 1927

Industry Shows Increased Riding in 1926 Over 1925 Despite a Readjustment in Operating Conditions—Electric Railway Executives in All Sections of the Country Predict Further Development During the Coming Year

FROM all sections of the country comes evidence that there was an improvement in electric railway business last year over 1925. While there are individual instances where there was a recession, they are comparatively few. In general, the revenues of electric railways and their allied bus systems have followed the improvement in business that has been nationwide.

The increase in gross business has resulted from a growth in the number of revenue passengers that has been going on for many months, following the recession of 1924 and 1925. Revenue passengers on cars and buses of 217 companies reporting to the American Electric Railway Association covering the period of the first eleven months of 1926 were 8,787,657,991 as compared with 8,682,740,211 in the corresponding period of 1925. This is an increase of 1.21 per cent. These figures represent somewhat more than one-half of the industry. On this basis the total riding for the twelve months will approach closely, if it does not exceed, the riding for 1923, which was the previous banner year of the electric railway business.

Along with this increase in passenger traffic the fares charged over the country have held up. In fact, there has been a slight but continuous increase in the fare index throughout the year from 151.2 to 153.2, or 1.33 per cent. Thus it would appear that the revenues have been greater than those of 1925 by about 1.6 per cent. The exact figure is subject to minor revision, when final figures for the year become available.

Fluctuations in operating expenses have been somewhat greater than those of passengers and revenues. Some companies have introduced economies that have permitted them to earn an increased net, while others, particularly those faced with wage advances, have not been able to make so good a showing. For the industry as a whole it is unlikely that there has been any material change in the net income from that obtained in 1925.

GOOD BUSINESS PREDICTED FOR 1927

As regards the future, continued growth in riding and in revenue is forecast by the prospect of continued business prosperity through the coming year. Railway men are in general optimistic about the situation. In this they are in agreement with such industrial leaders as Elbert H. Gary, chairman of the United States Steel Corporation; Charles E. Mitchell, president of the National City Bank of New York; W. C. Teagle, president of the Standard Oil Company of New Jersey; Charles M. Schwab, chairman of the board of directors, Bethlehem Steel Corporation; Alfred P. Sloan, Jr., president of the General Motors Corporation, and many others who are nationally prominent. These men are almost unanimous in predicting that industrially the coming year will be the greatest the country has ever known. While 1926 was a year of comparative stability there was a gradual expansion of business activity, so that the beginning of 1927 finds the country at the peak of prosperity.

Electric railway men all over the country are of the opinion that the new year, while not in any great respect different from the one just closed, will show greater business and increased revenue over 1926. There will be places where the general prosperity will not extend, of course; but in that respect last year was not in any marked degree different. It is in the larger industrial centers that there is and will be the greatest measure of prosperity. In these centers the activity has reached greater heights, and in them the use of individual modes of transportation, such as the private automobile, is more difficult, so that the need for common carriers is the greater. In the small cities the automobile has made serious inroads, so that there has not been a growth in riding on street cars and buses comparable with the population and its activities. Conditions in medium-sized cities are somewhat varied, depending to a considerable extent on the local political situation and the ability of the individual managements to apply business principles to the conduct of their systems.

In order to get definite information relative to the actual conditions existing throughout the industry, ELECTRIC RAILWAY JOURNAL has requested a number of prominent electric railway executives to give their estimates of business done by their companies in 1926

> YESTERDAY'S problems are waters over the dam. Today's problems are what we are confronted with, and every he-man in the industry, from the humblest employee to the chief executive, must give the best there is in him, not only to hold the ground we have gained for our patrons and our investors but to accomplish even better results in 1927.
>
> Enthusiasm, up and down the line, is what we need more than anything else. Let's have it! Apathy, now that the street railway industry has turned the corner and is again on the high road to prosperity, is unthinkable. Railroading in these days is an entirely different proposition than it was a few years ago. None of us can afford to stand idly by and watch the parade. We must be in it and right up in the front ranks.—*R. B. Stearns.*

as compared with previous years, and their estimates of what the coming year may be expected to develop. These properties represent large and small systems, both urban and interurban. Some of them operate buses in conjunction with the rails, while others do not. All sections of the United States and Canada are included. With few exceptions the replies indicate that this year is likely to exceed last year by a satisfactory margin.

Even in New England, which has had many industrial difficulties during the year, the street railway business has not suffered. Both of the leading street railway systems in Massachusetts have had increased gross business. Edward Dana, general manager Boston Elevated Railway, reports a gain, both in riders and in revenue. He says:

THE approximate results of operations of the Penn-Ohio Transportation System, both railway and bus lines, for the year 1926 will show a distinct improvement over similar operations for the year 1925. The combined passenger revenue on railway and bus lines will show an increase of about $125,000, or more than 3½ per cent, while the operating expense will show a reduction of about $10,000, or about 0.3 per cent. Together these will increase the net earnings approximately $135,000, or more than 18 per cent.

The decrease in operating expense has been accomplished with a slight decrease in car mileage but an increase of 250,000 bus-miles, or more than 10 per cent. The operating expenses of the railway lines show savings amounting to about $138,000, due to a great extent to the modern light-weight noiseless cars with which all our lines are now completely equipped.—*R. P. Stevens.*

> Our gross income will be approximately $800,000 more in 1926 than in 1925. The total revenue passengers will be approximately 5,000,000 more than in 1925.
>
> Our trustees' fiscal year ends June 30, to which end our operation is directed. The calendar year 1926 will show the cost of service several hundred thousand dollars in excess of receipts, to be overcome before June 30, 1927. There was a slight surplus on June 30, 1926, and we expect to do equally well next June. There is no indication at the present time of other than continued normal conditions.

On the Eastern Massachusetts Street Railway, which operates in a number of the mill towns, such as Lowell, Lawrence and Lynn, conditions have been somewhat less favorable. However, the situation is hopeful, as is indicated by the following statement from R. B. Stearns, vice-president and general manager:

> The following is an operating statement of Eastern Massachusetts Street Railway from 1920 to 1926 (eleven months) inclusive:

	Gross Revenue	Operating Net After Taxes	Interest and Rentals	Surplus for Stock
1926 (11 mo.)	$8,605,873	$1,773,972	$1,141,683	$632,290
1925	9,333,250	2,030,143	1,291,820	738,323
1924	9,745,501	2,164,057	1,362,658	801,399
1923	10,712,706	2,276,687	1,398,152	878,535
1922	10,712,663	2,557,749	1,497,956	1,059,792
1921	11,318,264	2,515,410	1,623,021	892,389
1920	13,195,275	927,609	1,588,145	660,535

> With the close of the year 1926 another year of business success for the street railway industry has passed into history. No year since the period prior to the World War has been on the whole so satisfactory to this industry as 1926. Evidence has accumulated month after month that the public has at last come to the definite conclusion that electrically propelled street cars are absolutely essential to the welfare of every live community.
>
> We men who are directing the affairs of the street railways appreciate this and intend to strain every nerve during 1927 to show the car riders that we are deserving of their continued confidence. Yesterday's problems are waters over the dam. Today's problems are what we are confronted with, and every he-man in the industry, from the humblest employee to the chief executive, must give the best there is in him, not only to hold the ground we have gained for our patrons and our investors but to accomplish even better results in 1927.
>
> Enthusiasm, up and down the line, is what we need more than anything else. Let's have it! Apathy, now that the street railway industry has turned the corner and is again on the high road to prosperity, is unthinkable. Railroading in these days is an entirely different proposition than it was a few years ago. None of us can afford to stand idly by and watch the parade. We must be in it and right up in the front ranks.

Pittsburgh is the center of an industrial district which has had a different condition during the year from that of New England. Business has been good in the iron and steel industry, and this condition has been reflected in the street railway. It is noteworthy that with the greater traffic handled and larger number of car-miles operated, there has been a reduction in operating expenses. It is expected that this year's business will be even better, as is indicated by this statement of Vice-President Thomas Fitzgerald of the Pittsburgh Railways:

> The following is a tabulation of operating statistics of the Pittsburgh Railways for the years 1924, 1925 and 1926, with an estimate for 1927:

	1927 (Estimated)	1926	1925	1924
All passengers carried, including estimated pass rides	410,000,000	400,000,000*	370,412,204	326,673,344
Car-miles operated	41,900,000	41,280,000*	39,688,609	39,593,051
Revenue from street railway operations	$21,870,700	$21,720,000*	$21,813,696	$22,063,777
Operating expenses plus taxes	$17,410,916	$17,233,000*	$17,461,177	$18,028,919

* Eleven months actual, December estimated.

> The above estimate for 1927 is based on a continuation of the present industrial and commercial activity in Pittsburgh, which it is believed can reasonably be expected.

CONDITIONS IN CENTRAL TERRITORY

The manner in which the Coffin Prize winner for 1926 has been able to take advantage of good business conditions in the Youngstown district is indicated by the following statement of R. P. Stevens, president Republic Railway & Light Company, the holding organization which controls the Pennsylvania-Ohio lines:

> The approximate results of operations of the Penn-Ohio Transportation System, both railway and bus lines, for the year 1926 will show a distinct improvement over similar operations for the year 1925. The combined

passenger revenue on railway and bus lines will show an increase of about $125,000, or more than 3½ per cent, while the operating expense will show a reduction of about $10,000, or about 0.3 per cent. Together these will increase the net earnings approximately $135,000, or more than 18 per cent.

The decrease in operating expense has been accomplished with a slight decrease in car mileage but an increase of 250,000 bus-miles, or more than 10 per cent. The operating expenses of the railway lines show savings amounting to about $138,000, due to a great extent to the modern lightweight noiseless cars with which all our lines are now completely equipped.

From present indications the improvement shown this year should continue throughout 1927. Of course, it is impossible to say now whether the present slackening of business activity is merely a lull before another resumption of our forward progress or suggests a slower pace for the time being. As there is nothing apparent to menace our business situation and all the principal activities in the territory served by the Penn-Ohio system are in a flourishing condition, we have no reason to believe there will be any general let-up of business in the territory we serve, the present easing off being more than offset by results from economies which we are constantly putting into effect.

Considerable interest attaches to the results in Cincinnati, as the system in that city was reorganized only a little more than a year ago. Progress has been made in attracting customers to the cars and buses, as is indicated by this statement by Walter A. Draper, president Cincinnati Street Railway:

The Cincinnati Street Railway, which formerly leased its property to another operating company, resumed operation on Nov. 1, 1925. Consequently it is just completing the first full year of operations. Comparison of revenues with the preceding year would be confusing, due to reduction in rates of fare. The year, however, has shown gratifying increase in riding on street cars, while the operation of motor coaches, begun last spring, has apparently developed a new field without reducing car riding. Operating expenses have increased due to extensive track reconstruction. The new year promises a continued trend toward increase in street car riding and away from automobiles and independent motor coach operations. Indicated improvement in general business conditions, which will be helped by several large undertakings going forward in Cincinnati, also will be reflected in more use of cars and coaches.

Another Ohio city in which important developments have taken place during the year is Cleveland. With the negotiation of a new franchise, and an increase in the rate of fare, the results have not only been good, but the outlook for 1927 is even better. Paul E. Wilson, vice-president and secretary of the Cleveland Railway, summarizes the situation as follows:

The operations of the Cleveland Railway in 1926, on the whole, were satisfactory. While the volume of traffic was less than we could have wished for and have handled, it approximates the volume of the preceding year, which had one more day. In six months of the year we showed an increase in the number of revenue riders and in eight months of the year an increase in the total number of riders. Indeed, the first half of 1926 gave every promise of bettered conditions, and the decrease during the last half, in addition to being spotty, may be due in part to the fact that on Oct. 15 the rate of fare was advanced. Our situation was further complicated by the fact that a new franchise was granted us and became effective on July 1. The year 1926 was also our first full year of operation of motor coaches. To this operation supplementing our existing rail service we credit the fact that the total number of riders on the system was greater this year than last. Our passenger earnings were also greater, due largely to the change in the rate of fare, but in a considerable part to our coach operations. Our expenses likewise were greater, due to a general wage increase effective on May 1. We face 1927 with confidence, believing that relief from traffic congestion is here and that with more rapid running time and regularity of schedules, both of cars and coaches, we shall be favored with a constantly increasing patronage.

Conditions in Indianapolis are somewhat less favorable than in the cities already cited. Private automobiles have made inroads, as have competing buses. The loss in revenue due to these causes has been of minor effect, however, as compared with the increased operating expenses. The Terre Haute, Indianapolis & Eastern Traction Company, the street railway lines operated by the same management, has had an increase in revenue for the year. Expenses, however, have increased more than in proportion, so that the net has gone down slightly. More complete information is included in the following statement by Robert I. Todd, president of the two companies:

THE Cincinnati Street Railway has shown gratifying increase in riding on street cars, while the operation of motor coaches, begun last spring, has apparently developed a new field without reducing car riding. Operating expenses have increased due to extensive track reconstruction. The new year promises a continued trend toward increase in street car riding and away from automobiles and independent motor coach operations. Indicated improvement in general business conditions, which will be helped by several large undertakings going forward in Cincinnati, also will be reflected in more use of cars and coaches.—*W. A. Draper.*

Below are comparative statements of earnings and operating expenses of the Terre Haute, Indianapolis & Eastern Traction Company and Indianapolis Street Railway for the years 1925-1926.

Indianapolis Street Railway

	1925	1926
Gross earnings	$5,536,370	$5,499,908
Operating expenses	4,032,821	4,344,927
Net earnings	$1,503,549	$1,154,981
Taxes	386,624	295,538
Net earnings less taxes	$1,116,924	$859,443
Fixed charges	629,183	629,058
Net income	$487,742	$230,385
Sinking funds	146,567	153,150
Dividends accrued not paid	300,000	300,000
Balance—deficit	....	$222,765
Balance—surplus	$41,175	....

Terre Haute, Indianapolis & Eastern Traction Company
Income Account, 1925 and 1926

	1925	1926
Gross from operating	$5,491,091	$5,674,986
Non-operating income	54,762	53,167
Total	$5,545,853	$5,728,153
Operating expenses and taxes	4,487,672	4,682,797
Gross income	$1,058,181	$1,045,356
Fixed charges	890,448	896,327
Net income	$167,733	$149,029
Sinking fund	227,513	232,393
Deficit	$59,780	$83,364

Note—November and December, 1926, estimated.

The results of operation of the T.H.,I.&E. for the years 1925 and 1926 have been about the same. There is, as you are aware, a proposed merger of the T.H.,I.&E. Traction Company and its subsidiaries with the Indiana Electric Corporation, Central Indiana Power Company and its subsidiaries, which is still being worked out. Until this is completed it will be difficult to estimate the earnings for 1927.

The Indianapolis Street Railway gross earnings for 1926 show a decrease over 1925. This is principally due to the constantly increasing use of privately owned automobiles and independent bus competition. The increase in operating expenses is due largely to the company's being obliged to run a large number of feeder buses, which are operated at a loss. The Indianapolis Street Railway has begun the construction of five new substations in the city of Indianapolis, which will be completed in a few months. It is expected that these will result in a substantial saving in the cost of power.

THE operations of the Cleveland Railway in 1926, on the whole, were satisfactory. The year 1926 was also our first full year of operation of motor coaches. To this operation supplementing our existing rail service we credit the fact that the total number of riders on the system was greater this year than last. Our passenger earnings were also greater, due largely to the change in the rate of fare, but in a considerable part to our coach operations. Our expenses likewise were greater, due to a general wage increase effective on May 1. We face 1927 with confidence, believing that relief from traffic congestion is here and that with more rapid running time and regularity of schedules, both of cars and coaches, we shall be favored with a constantly increasing patronage.—*Paul E. Wilson.*

Another interurban railway operating out of Indianapolis is the Interstate Public Service Company, which runs to Louisville. Favorable results, both for last year and for 1927, are indicated in the following statement by Harry Reid, its president:

> The approximate results of our operations for the year 1926, with December estimated, show an increase in passengers carried of 1.6 per cent over the year 1925. The total income shows an increase of 4 per cent. There is a decrease in expenses of 3.8 per cent. The net income for the year 1926 is 93.2 per cent more than for the year 1925.
>
> The prospects for the year 1927 indicate that we should do as much business as we have done this year and with further economies in operation our net showing should be better.
>
> The above figures do not include bus operation.

Still another combination of city and interurban companies is seen at East St. Louis, Ill. Automobile competition has resulted in a decrease in business. It has not been possible to reduce expenses in line with the revenues, so that the showing has not been so favorable as in the case of some of the other properties. The figures for 1925 and 1926, with an estimate for 1927, were furnished by F. L. Reardon, assistant treasurer East St. Louis & Suburban Railway:

> We give below the actual and estimated figures for the East St. Louis Railway and the East St. Louis & Suburban Railway:

	1925	1926	1927
East St. Louis Railway:			
Revenue passengers	13,082,576	12,000,000	11,500,000
Operating revenues	$1,094,843	$1,035,000	$1,000,000
Operating expenses	$792,601	$844,000	$850,000
East St. Louis & Suburban Railway:			
Revenue passengers	6,140,000	5,950,000	5,650,000
Operating revenues	$977,432	$1,042,000	$1,000,000
Operating expenses	$883,461	$1,084,000	$1,000,000

RESULTS FAVORABLE IN WISCONSIN

Two electric railways in Wisconsin have furnished statements, and both of them are favorable. In Milwaukee there has been a gain in revenue the past year, although expenses have kept the net revenue down to the same amount as in 1925. It is, however, estimated that there will be an increase for 1927, according to the following statement by S. B. Way, president the Milwaukee Electric Railway & Light Company.

	Twelve Months Ended Nov. 30 1926	 1925
Operating revenue	$10,924,928	$10,586,527
Operating expenses, taxes and depreciation	9,444,766	9,105,922
Net operating revenues	$1,480,162	$1,480,604
Revenue passengers carried	154,685,591	150,500,871
Revenue car-miles	28,032,709	26,563,145
Gross capital expenditures	$2,647,932	$1,904,551
Property retirements	811,167	889,484
Net increase in capital	$1,836,765	$1,015,067

> The company estimates an increase in traffic and operating revenues in 1927 of 2¼ per cent over traffic and revenues of 1926.

The advantage of new equipment is shown in the statement of H. L. Geisse, general manager Wisconsin Valley Electric Company, Wausau. While 1926 has been better than 1925, both in gross and net revenue, the replacement of old cars with new, modern ones and the extension of bus service are expected to make a material increase in business. His statement follows:

> Following are the statistics of this company for the last two years:

	1925	1926 (Estimated)
Passengers carried	2,772,203	2,981,553
Revenue	$131,410	$151,976
Operating expenses	$96,769	$113,445

> The year 1927 bids fair to be a better year for street railway operations than was 1926. We have just replaced two of our older type cars with new double-truck, 52-seat cars built by the American Car Company. It is probable that during 1927 our urban bus operations will be extended. I would look to see the total passengers carried in 1927 run to 3,200,000, or an increase of approximately 7 per cent. A corresponding increase should take place in our revenues, with little if any increase in expense. The reason for this is that our operating expenses this year include a very high per cent of maintenance which was entirely abnormal.
>
> We plan to spend about $30,000 the ensuing year on replacement of track.

In the far West conditions are remarkably steady, as is evidenced by the operations of the Portland Electric Power Company, Portland, Ore. The past year showed a trifle less revenue than 1925, with expenses slightly higher. The outlook for 1927 is that the past year's results will be duplicated, according to Vice-President W. H. Lines:

The following tabulation shows revenues, expenses, passengers carried and mileage for the years 1925 (actual) and 1926 (eleven months actual, one month estimated).

	1925	1926
Operating revenues	$4,835,977	$4,712,000
Operating expenses	3,520,894	3,567,000
Taxes	290,000	325,000
Bridge rentals	98,000	95,500
Revenue passengers	61,772,709	60,300,000
Transfer and free passengers	24,033,796	26,000,000
Car-miles operated	14,750,000	15,000,000

I cannot foresee any change in local conditions which would materially increase or diminish our revenue during the coming year, nor do I anticipate any great variation in expenses. I think, therefore, that it is safe to apply the 1926 figures as a forecast for 1927.

INCREASED RIDING IN THE SOUTH

In the South the industrial activity has not been so pronounced as in other sections of the country. Street railway revenues have shown an increase, however. The following statement by H. H. Flowers, president New Orleans Public Service, Inc., shows not only a healthy growth in riding for 1926, but an equal expansion this year:

Railway earnings for 1925 of the New Orleans Public Service, Inc., were $7,527,444. The estimated earnings for 1926 will be $7,627,092. For 1927 the forecast of earnings is $7,710,197. It is impossible to furnish comparison of expense, as we do not entirely segregate departments.

The Georgia Railway & Power Company, Atlanta, has had an almost equal increase in business. This system, however, segregates railway expenses. It is seen that there has been a large reduction in operating cost so that the net revenue for 1926 has been materially greater than in 1925. This year promises to show even better results, according to the following statement by Frank L. Butler, vice-president and general operating manager:

The result of the 1926 operation of Atlanta railway will show an increase in revenues of slightly more than $110,000, with a decrease in operating expenses of $130,000. We confidently expect 1927 to show conditions even more greatly improved. Our estimates contemplate increased revenue amounting to $81,000, with a further decrease in operating expenses of $48,000.

Properties operated by the Doherty interests cover a wide range of conditions. The largest city included is Toledo, while there are a number of smaller cities in which street car and bus service is furnished. The properties are separated into groups for convenience in comparison. Little change is expected in any of the groups, except that including Durham, N. C., where an expansion of the service, including the installation of bus lines co-ordinated with the car lines, has brought a 20 per cent increase in revenue, with the prospect that the net this year will be practically double that of 1925. Following is a brief review of the situation by R. F. Carbutt, of Henry L. Doherty & Company.

On the Missouri properties the gross for 1926 as compared with 1925 fell off about 4 per cent. It is anticipated that there will be a further recession in business in 1927. The operating expenses were reduced materially, largely on account of wider adoption of the one-man car. This resulted in an increase in the net for 1926 as compared with 1925. A further decrease in operating expenses in 1927 is expected, so that the net revenue will remain approximately the same as in 1926.

In Ohio all of the properties show a decrease in gross business in 1926 as compared with 1925. The operating expenses also decreased slightly, but there was a small decrease in the net. For next year it is anticipated that there will be a material increase in the gross revenue, with a slight further decrease in operating expenses. This will result in a considerable increase in the net income of these properties.

In the North Carolina group Durham is making the best showing, the 1926 gross revenue with a co-ordinated car and bus system being about 20 per cent over the last year's with street cars alone. It is expected that there will be a further gain of about 10 per cent in gross for 1927. Operating expenses increased in 1926, principally as a result of the expansion of the service, and as it is planned to expand further in 1927 the expenses will show an additional increase. Net operating revenue for 1926, however, is materially over that for 1925, and it is expected that in 1927 the net will be practically double that of 1925. While new capital has been added, the increased net is sufficient to provide a satisfactory return on it.

> ON THE Toronto Transportation Commission's system, commencing in February of this year, each month has shown an increase over the corresponding month of last year, the improvement increasing each month. The improvement in 1926 will be about 2,500,000 passengers, or $150,000. Our expenses have remained approximately the same as 1925, or 28.5 cents per car-mile exclusive of depreciation. One-man car mileage is 15 per cent of the total. Our operating ratio of 62.8 is the same this year as last.
>
> We believe and hope that business conditions will continue to improve during 1927; given the same improvement in 1927 as in 1926, our traffic will equal that of 1923, which was our peak year.
> —*D. W. Harvey.*

The miscellaneous properties of the company in general show a decrease in gross for 1926 as compared with 1925, and a small reduction in net. Economies are being introduced which will result in an increased net for 1927.

CANADIAN ROADS ALSO GAIN

Operating results obtained by two important systems in Canada indicate that conditions there practically parallel those in the United States. In Toronto the railway system now operated by the city has been established long enough that it reflects the conditions incident to general business rather than the change from private to public management. The decrease in riding which was experienced for a time has not only been checked, but there has been a steady growth in passengers and in revenue for practically a whole year. With the greater business it has been possible to maintain the same operating ratio, so that the net has gone up in proportion. Next year's business bids fair to be even better, according to D. W. Harvey, general manager Toronto Transportation Commission.

This system's traffic decreased slightly each month from July, 1923, to February, 1926—that is, in comparison with the corresponding month of the previous year. The decreases were due primarily to quiet business conditions and secondarily to the increasing use of private motor cars.

Commencing in February of this year each month has shown an increase over the corresponding month of last year, the improvement increasing each month. The improvement in 1926 will be about 2,500,000 passengers, or $150,000. Our expenses have remained approximately the same as in 1925, or 28.5 cents per car-mile exclusive of depreciation. One-man car mileage is 15 per cent of the total. Our operating ratio of 62.8 is the same this year as last.

We believe and hope that business conditions will continue to improve during 1927; given the same improvement in 1927 as in 1926, our traffic will equal that of 1923, which was our peak year.

"Motor coach" in this organization means vehicles employed in other than universal fare transportation and includes chartered coaches, sightseeing and school contracts. We operated our first motor coaches in the early spring of 1925; this year our motor coach gross will be more than $300,000, or about double that of 1925.

Good operating results have also been obtained in Montreal. Gross earnings have gone up 2.81 per cent and net earnings 7.08 per cent. With only a slight increase in fixed charges for the year, there was left a balance for the stock 58 per cent ahead of that in 1925. It is expected that the gain will continue throughout this year. This is indicated in the following statement by H. E. Smith, comptroller Montreal Tramways:

			Increase 1926 over 1925	
Revenue:	1926	1925	Total	Per Cent
Car earnings	$12,573,000	$12,216,000	$357,000	2.92
Miscellaneous earnings	327,000	331,000	—4,000	—1.21
Gross earnings	$12,900,000	$12,547,000	$353,000	2.81
Expenses:				
Operating expenses and taxes	$6,543,000	$6,244,000	$299,000	4.79
Operating profit	55,000	52,000	3,000	5.77
Maintenance and renewals	2,598,000	2,792,000	—194,000	—6.95
Total	$9,196,000	$9,088,000	$108,000	1.19
Net earnings	$3,704,000	$3,459,000	$245,000	7.08
Fixed charges	3,321,000	$3,217,000	$104,000	3.23
Balance	$383,000	$242,000	$141,000	58.22
Revenue passengers	207,829,042	201,503,238	6,325,804	3.14
Mileage passengers	24,917,169	23,657,062	1,260,107	5.33

> I am sending you herewith a statement of the approximate results of operations for the year ended Dec. 31, 1926, compared with the previous year. With respect to next year, 1927, we expect a continued improvement of about the same proportions as 1926 over 1925.

Chicago Surface Lines Operates 100% of Equipment

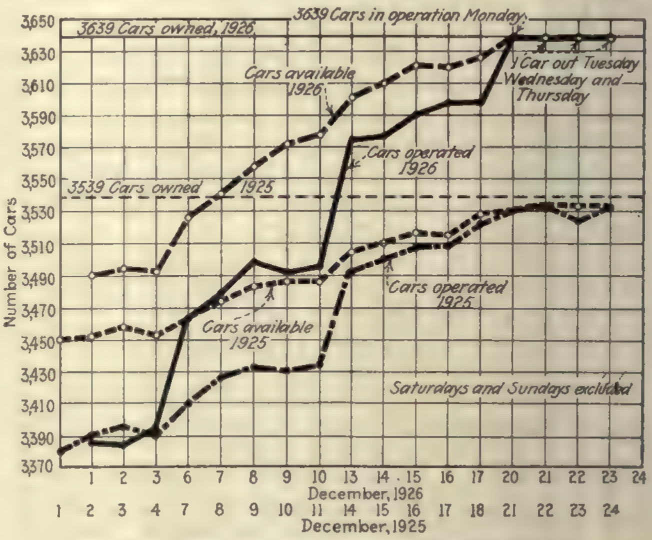
Co-operation Between Equipment and Transportation Department Makes Possible Operation of Every Car Owned by this Largest Street Railway System During Peak Day Before Holidays

A RECORD unique in the performance of electric railway properties in large cities was established by the Chicago Surface Lines during the peak shopping week immediately preceding the Christmas holidays. Riding during this period broke all records in the company's history, and exceeded the heavy volume of the Eucharistic Congress last June, at which time the hundreds of thousands of visitors in the Illinois metropolis threw a heavy load on all of the city's transportation facilities.

Dec. 18 was the biggest day in the history of the system. On that day 5,148,000 riders were carried. On Dec. 20 there were 4,959,686 rides; on the 21st, 4,853,400; on the 22d, 4,851,406, and on the 23d, 4,906,477. Revenue passengers for the year show an increase of 4 per cent over the corresponding period in 1925.

For a number of years, it has been the practice of the Surface Lines management to taper off overhaul work in the shops during the month of December, so as to make available a maximum number of cars during the period of heavy riding immediately preceding the holidays. Each year has marked the establishment of new records for the percentage of equipment made available for service during this period. This has been made possible by close co-operation between the equipment and the transportation departments, and by a continuous program of putting car equipment in first-class condition through regular overhauling and attention to maintenance details.

During a normal period the number of cars held in carhouses on the system for repairs averages 25.2 cars, or 0.7 per cent of the equipment owned. Cars in the two shops for overhaul and major repairs averages 117, or 3.26 per cent of the cars on the property. This makes an average of 142.2 cars per day held out of service for the mechanical department during a normal period. By arranging the maintenance program so as to make these cars available for service during the week of maximum load, an investment in extra equipment to meet a short annual peak is avoided. On the basis of $15,000 per car, this performance results in putting approximately 140 additional cars in service when they are most needed, at a saving in car investment of approximately $2,100,000.



100 Per Cent Car Service During Rush Period Was the Record in Chicago

Every car of the 3,639 owned by the Chicago Surface Lines was in service on Monday, Dec. 20, at the height of the Christmas shopping rush. The number of cars available for service each day during December, and the number actually operated, are shown in comparison with the corresponding period in 1925.

On the accompanying curves are shown the number of cars available for service and the number actually operated during the month of December, 1926, in comparison with the same period during 1925. Purchase of 100 new cars during the year increased the number on the property from 3,539 to 3,639. On Dec. 20, 1926, every car on the property was in operation carrying the heavy holiday load. On Dec. 21, Dec. 22 and Dec. 23 all cars but one were kept in service. This performance is particularly interesting in the light of the fact that this company operates entirely in city streets, through heavily congested traffic.

The record was made under winter conditions when slippery rails and pavements made traffic accidents particularly troublesome.

$263,830,000 Estimated for Equipment and Supplies in 1927

Essentiality of the Electric Railways Indicated in Forecast of Purchases for Maintenance and New Equipment for Coming Year—An Increase of 13.2 Per Cent Over 1926 Is Based on Extensive Survey—New Cars and Track Are Featured, While Bus Expansion Is on Slightly Lower Scale

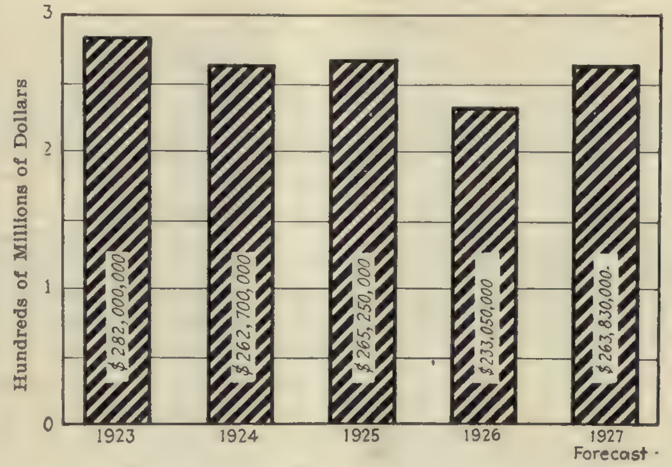
WITH the indication of increased expenditures for the year 1927, based on returns from companies representing half of the industry, it is a safe prediction that the railways will continue next year on a conservative basis. While the year just closed did not measure up to the forecast made a year ago, the replies received indicate considerably better results for 1927.

Actual expenditures for new plant and equipment for 1926 fell behind 1925 by about $7,000,000. The principal setback was apparently in the track accounts. Plans for track rehabilitation and extensions made a year ago have in many cases been delayed and are now estimated for 1927.

New cars will probably reach a total in excess of 3,000 for the coming year according to the compilation made from the returns received. These estimates are for small as well as large city properties. The total estimate for new cars and modern equipment for remodeling old cars is $55,000,000 an increase of nearly 38 per cent over that spent in 1926.

New electric power facilities show an upward trend. The actual figures for 1926 indicate an increase over the forecast made a year ago and 1927 promises a further increase. This reflects the installation of automatic substations and the continuance of the policy of changing from isolated generation to a basis of power purchased from central stations.

None of the estimates for new equipment or for



Total Expenditures for New Plant and Maintenance Materials and Supplies Show Industry Is Holding Its Own

A graphical representation of the purchasing power of a six billion dollar industry with a billion dollar annual income.

PURCHASES PLANNED BY ELECTRIC RAILWAYS FOR 1927, COMPARED WITH ACTUAL ESTIMATES OF PAST YEARS PREPARED BY "ELECTRIC RAILWAY JOURNAL"

New Plant and Equipment—Capital

	1922	1923	1924	1925	1926	Forecast 1927
Way and structures	$85,000,000	$74,000,000	$56,000,000	$52,400,000	$51,200,000	$64,400,000
Equipment ... Rail	38,000,000	78,000,000	60,200,000	50,000,000	40,000,000	54,950,000
Buses				15,680,000	17,540,000	15,410,000
Power	28,000,000	28,000,000	17,000,000	5,150,000	7,640,000	10,350,000
Total	$151,000,000	$180,000,000	$133,200,000	$123,630,000	$116,380,000	$145,110,000

Maintenance Materials and Supplies—Operating

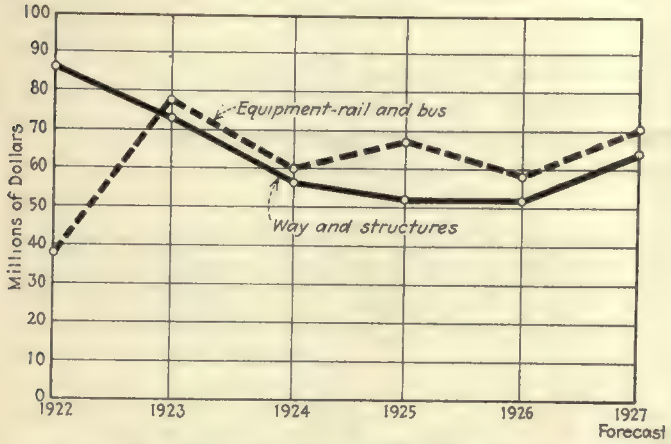
	1923	1924	1925	1926	Forecast 1927
Way and structures	$42,000,000	$57,500,000	$56,900,000	$50,000,000	$51,900,000
Equipment ... Rail	44,000,000	54,000,000	54,700,000	47,800,000	48,400,000
Buses			7,370,000	7,500,000	8,020,000
Power	16,000,000	18,000,000	22,650,000	11,370,000	10,400,000
Total	$102,000,000	$129,500,000	$141,620,000	$116,670,000	$118,720,000

TOTAL OF NEW PLANT AND MAINTENANCE MATERIALS AND SUPPLIES

	1923	1924	1925	1926	Forecast 1927
Way and structures	$116,000,000	$113,500,000	$109,300,000	$101,200,000	$116,300,000
Equipment ... Rail	122,000,000	114,200,000	105,100,000	87,800,000	103,350,000
Buses			23,050,000	25,040,000	23,430,000
Power	44,000,000	35,000,000	27,800,000	19,010,000	20,750,000
Grand total	$282,000,000	$262,700,000	$265,250,000	$233,050,000	$263,830,000

maintenance include the cost of purchased power or the cost of fuel of those companies that generate their own electrical energy.

Because of the rising importance of bus operation by electric railways the plan of separating bus equipment and new cars was first established last year and has been continued this year. It is expected that this item of bus equipment expenditures will be of ever increasing importance because of the relatively short life of rubber-tired vehicles as compared with that of electric cars. This year bus purchases are estimated at $15,410,000, a decrease of 11 per cent over those actually purchased during 1926.



New Plant and Equipment Expenditures Show Healthy Condition

Analysis of purchases in the past five years with the JOURNAL'S forecast based on a survey of the coming year indicate the stability of the industry and a sound expansion.

PROPERTIES WELL MAINTAINED

Maintenance accounts are about normal. The total for 1926 is lower than the forecast by the reduction in the power account alone equaling $11,000,000 and the forecast for 1927 shows a further slight reduction in the power group, again reflecting the gradual shift to a purchased power basis.

Bus maintenance shows an increase in 1926 and again in 1927 in proportion to the increase in buses operated by the railways.

FORECAST PREPARED ON A BROADER BASIS

This is the fifth forecast of ELECTRIC RAILWAY JOURNAL based on a survey conducted in December of each year. This year the survey was extended much further, questionnaires having been sent to a larger group of railway companies than heretofore in the United States and Canada. Replies have been received from over 200 companies, large and small, in all representing 50 per cent of the electric railway mileage.

Based on the replies received, the companies' returns for 1927 were totaled and prorated to cover the entire industry in the United States and Canada. In this proration not only car-miles and the number of cars operated are considered, but a study of the individual returns is made in order to eliminate the effect of unusual circumstances.

CONSTRUCTION FINANCED FROM PUBLIC FUNDS EXCLUDED

As usual these expenditures do not include construction or estimated construction of subways or elevated structures that are financed largely out of public funds. It is of interest to remember that enormous expenditures of this nature are now being actively considered or expended in New York, Philadelphia and Chicago. Much of the New York and Philadelphia work has been going on for the past year and it is quite likely that appropriations will soon be made and work begun on the first units of subway construction in Chicago and further extensions in New York. Likewise, expenditures for electrified steam railroads are not included in this forecast. Of greatest interest in this connection has been the completion of the Illinois Central suburban system out of Chicago during the past year. Heavy expenditures on the part of the New York Central Railroad; New York, New Haven & Hartford; the Virginian and the Great Northern were either made or are in progress at the present time.

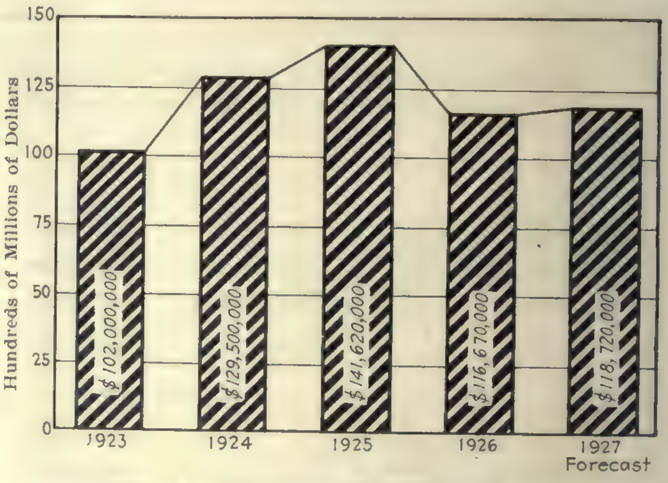
It should be borne in mind that the estimates given are only for the purchase of materials and supplies used in the operation of electric railways, and labor incident to the installation and use of such supplies has been omitted.

GASOLINE AND ELECTRIC POWER ADDITIONAL ITEMS

A factor of ever-increasing importance to gasoline and oil companies is the increasing use of motor fuel for the operation of buses. These figures do not include estimates of gasoline and oil consumption. Such figures, if available, would swell the purchases made by approximately $6,000,000.

About 13,000,000,000 kw.-hr. are used by the electric railways every year, half of which is purchased from light and power companies for the annual sum of $56,000,000. The remaining half that is generated in railway-owned power stations represents additional expenditures for fuel not included in the tabulation and charts presented herewith. It is interesting to note in this connection that the electric railways consume 17 per cent of the total energy generated in all power stations.

Coal purchased by electric railways for the 6,500,000,000 kw.-hr. generated would probably total $13,000,000.



Industry Is Maintaining Its Physical Property

About 12 per cent of the billion dollar income is spent for maintenance materials and supplies, not counting fuel for buses or power houses nor the cost of purchased power.

In all, the money spent for fuel by the industry or for purchased power totals $75,000,000 annually and is in addition to the estimate of materials and supplies shown herewith.

The estimate of expenditures is intended to show the purchasing power of the industry for manufactured equipment and supplies.

An Industry Can Be Sustained Only by the Whole-Hearted Co-operation of Those Engaged in It

With apologies to the Public Service Railway

Some of Us Would Be Homesick in Heaven

Such Are the People Who Could Read This Account and Not Subscribe to the View That Times Change and We Change with Them—The Plastic Age in Transportation Appears to Be at Its Height

By G. J. MacMurray

News Editor ELECTRIC RAILWAY JOURNAL

IT DID NOT escape Ben Franklin that dough begins with do. Neither has that fact escaped the attention of electric railway men. True, some of those who slipped on the banana peel eight or ten years ago are still sitting on the pavement talking of the cause of their fall rather than trying to regain the prestige lost, but the cases are few and far between. The old goods are being put up in new packages just as Mr. DeLamarter did in Grand Rapids and as many others have done and are doing all over the country. We are wooing the public.

It's not so much what you do as the way you dress up what you do that counts. Many of us who even now deplore the passing of the Old Cap. Collier stories haven't yet discovered that the series is still running, but that you have to pay $2 now for the old 10-cent stuff. Despite this, many sound efforts are being made to merchandise the service. We are even sloganizing the service. Why, less than 24 hours after the announcement had been made that the Penn-Ohio Electric Company had won the Coffin award, the cars and buses of that company appeared on the streets with a decalcomania on their sides apprising the public of the achievement of their company, for it is their company since many of them are stockholders. The idea was to catch the public eye. The motivating force was the same that prompted the stocking merchant mentioned by Mr. Wickwire in his inimitable speech to advertise "happiness hose—for contented calves." If a Nickelodian may be permitted, isn't Mr. Wickwire really the witwire of the industry?

The "appeal of appearance" idea has really made great headway. It would be physically impossible within the limits of an article such as this to crowd in mention of everybody deserving of credit for fostering this forward movement. Quoting Mr. Wickwire once again, "Anything can be done if no one cares who gets the credit." Not all has been done that might be done, but the preponderance of evidence is on the side of the industry's accomplishments. Those with the hardihood to do so may run the matter down in detail in the JOURNAL indexes covering the contents of the last two volumes.

It is not a case of being like Ikey's lawyer, who was left out in the cold. Ikey got into trouble and went to his lawyer.

"If I win this case, I will give you a thousand dollars," he said.

"Very well," said the lawyer, "get some witnesses."

Ikey got his witnesses and won his case.

"Well," said the lawyer, "you have won your case. What about my thousand dollars?"

"That's all right," said Ikey, "you get some witnesses."

The witnesses are here galore. Looking for evidence of progressiveness in the electric railway industry is like looking for Pike's Peak in Teller County, Colorado. You can't miss it. Clint Morgan over in Brooklyn, to cite just one instance, when he receives the last of the now impending order of new cars for his company, won't have a trolley in service that antedates 1920. That may not be the record in modernization, but it is offered as an exhibit for a system of its size. After all, it is the mirror that gets right back at you.

Down in Washington they went in for a new color scheme in cars. Similarly the Detroit United Railway began painting its cars in new colors, with the monogram of the company on the sides of the car in azure blue with a black border. These are merely recorded events. But both Mr. Storrs and Mr. Cobb have not hesitated to discuss frankly some of the basic factors of the electric railway situation. They and others have done the directing and the prescribing. Remember how the husband of the supersensitive wife said to a physician who had just given him a message for the wife:

"Doctor, would you mind telling her yourself?"

SPEAKING RIGHT OUT IN MEETING

Men prominent in the electric railway industry haven't minded telling the story themselves. At Cleveland T. A. Kenney, Alfred H. Swayne, E. B. Meissner, Samuel M. Curwen and others all dwelt upon the car as the show window of the industry. It was at this meeting that Thomas Fitzgerald of Pittsburgh said that winning the public support was the first step in selling city service, and it was at Cleveland that the Advisory Council outlined the fundamentals of success, the first of which was: "Obtain the friendly co-operation of the public." And by the way, the convention is going back to Cleveland next year. It was a great show, this one of 1926. Freddie Dell, who insists that figures tell the most forceful story, has supplied the final computation.

Say It with Figures, by Freddie Dell

Year	Convention City	Convention Registration	Percentage Increase or Decrease	Number of Manufacturer Company Members	Percentage of Increase	Number of Exhibitors at Conventions	Percentage of Increase	Total Space Sold, Square Feet	Percentage of Increase
1916*	Atlantic City......	3,271	.....	208	.....	125	.....	57,329	....
1917	New York City....	Conference only	.....	171	(D) 17.8	No exhibit	.....	No exnibit	....
1918	New York City ...	Conference only	.....	171	(D) 17.8	No exhibit	.....	No exhibit	....
1919	Atlantic City......	3,166	(D) 0.2	206	(D) 0.4	157	25.6	62,219	8.5
1920	Atlantic City......	3,300	0.9	200	(D) 0.3	136	8.8	59,529	3.8
1921	Atlantic City......	1,189	(D) 63.7	225	8.1	No exhibit	.....	No exhibit	....
1922	Chicago..........	4,200	28.4	244	17.4	141	12.8	61,895	8.0
1923	Atlantic City......	4,404	34.5	274	31.6	163	30.4	75,681	32.0
1924	Atlantic City......	5,804	77.4	330	58.6	192	53.5	86,349	50.5
1925	Atlantic City......	7,147	118.3	371	78.3	204	63.3	100,030	74.5
1926	Cleveland.........	8,623	163.5	423	103.3	271	116.9	119,007	107.7

*Figured on the basis of 1916 at 100 per cent.

Freddie is right. Those figures are mighty significant. In business it is buy-buy or by-by. As the vice-president of the General Motors Corporation said at Cleveland, speed in the personal car has modified the desires of the people with respect to service. Electric railways still render the best mass transportation, but people living away from car lines want service brought closer to their doors. And the electric railways are going right up to the front door for it. But correct equipment and facilities are needed if the best results are to be secured.

FIND THE JOB AND DO IT

It's a new order this, just like the one that came as a shock to the new office boy.

Boss: "Can't you find something to do?"

Office Boy: "Gee whiz! Am I expected to do the work and find it, too?"

That's just what is expected. It's what the Penn-Ohio system did; it's what the Pittsburgh Railways did with its two-bit football tickets; it's what the Chicago Surface Lines did in improving service in the face of many obstacles and an expiring franchise, and what the Key System Transit, the Chicago Rapid Transit Company and others did when their representatives went from door to door canvassing their prospective passengers. It's what the Bridgeton & Millville Traction Company, the United Railways of Providence, the Birmingham Electric Company, the Northern Texas Traction Company, the Terre Haute, Indianapolis & Eastern and others did when they erected posters and billboards. The Georgia Railway & Power Company, Atlanta, even used rotogravure copy.

Several electric railways have established parking areas at the end of their lines. An autoist leaves his car while attending to his business in town, rides downtown and back on the trolley cars, and then uses his automobile to reach his home. The railways in Philadelphia, Poughkeepsie, Fort Worth and Grand Rapids are following this plan. Sometimes a combination ticket permitting parking for the day and a round trip on the trolley line is sold. In Milwaukee there was a very successful open house week. So that its patrons might know beyond peradventure that they were not suffering from cold feet the United Railways & Electric Company is now hanging thermometers in its cars. To increase the morale among its men the Pittsburgh Railways and others virtually have valet services. Gentle reader, turn to the issue of Dec. 25, page 1138, if you have any doubts that a trainman can be made the glass of fashion and the mold of form! It was a story without words that the Utah Light & Traction Company told in this connection.

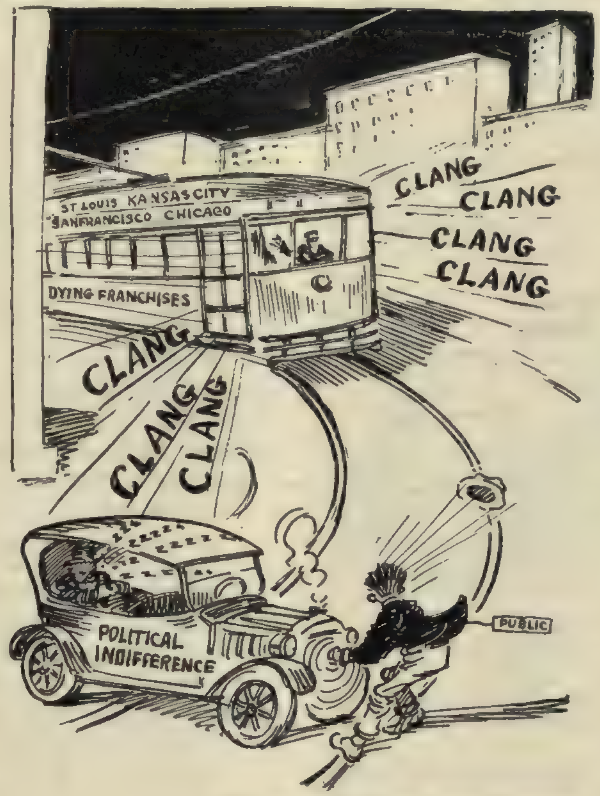
AD VENTURE PAYS

Slowly but surely it is being borne in on railway men that in all business the man who engages in the most ad ventures is surest to come out best. The Buffalo & Erie Railway, the Detroit United, the Illinois Traction and others are using electric signs at their terminals to advertise their service. The P. R. T., the Third Avenue Railway, the Seattle Municipal Railway and others have been on the air frequently with entertainment and a message. Even Santa Claus was turned to advantage at Christmas parties given by the Louisville Railway, the Beaver Valley and other companies. But no matter how much has been accomplished in the past the industry must look to the future and concentrate on things still to be done. The article "The Utility Powder Puff vs. the Utility Razor" in the JOURNAL for Jan. 6 reflected the sentiment of the flapper that "there are times when a pat on the nose is worth two on the back."

And as one checks up on the advertising campaigns in Chicago, in Baltimore, in Muskegon, the discussions at the conventions, notably the Southwestern

Public Service Association, and recalls the vogue of "A Texas Idea," again to mention just a few, one is reminded that the industry is turning to its own use the sentiments contained in the poem:

I would paint my name on the fences;
  I would picture my goods on the sheds;
I would send my cards to the brides-to-be,
  And call on the newlyweds!
I would make a list of the granddads,
  And the dear grandmothers, too;
Of the preachers and painters, the workmen and women,
  The poor and the well-to-do,
And I'd deluge them all with letters,
  Explaining their need of me!
I would picture my store as a bit of the town
  That everyone in it should see!
And when they arrived, I'd extend the glad hand
  The moment they entered the door,
With so hearty a greeting that after the meeting
  They would buy all the goods at My Store.



With apologies to the San Francisco Chronicle.

A Situation Serious for Everybody

YES, IT'S TRUE

And literally, it's true. Why, the Beaver Valley Traction Company entered the world of art and had a master painter picture the spirit of the local industries on the sides of a street car. It was this company's Beaver Valley girls that caused such a commotion at the Cleveland convention. It sounds like the good old days of the '90s when trolley excursions were quite the thing to read about the trolley shopping days in Jacksonville, Toledo, Seattle and other cities. Why, it is even likely that the electric railway will be charged with being a contributing factor to the flapper, for didn't a prominent Alliance lawyer thank the officials of the Stark Electric Railway for the passes? He said that he used the pass four times a day himself and then lets one of his children use it at night. It must have been this incident that inspired the muse to write the poem first published in our Convention Daily, which read:

Mary's Little Car

Mary had a little car,
  She drove to see the show,
And every time she tried to park
  The copper made her go.
And every time she tried to go
  The traffic made her stop.
She reached the theater just in time
  To see the curtain drop.
Now Mary has a little car
  That stays within a shed
And Mary goes to shops and shows
  In trolley cars instead.

Incidentally that little poem has gone the rounds pretty well, having even been reprinted in the *Wall Street Journal.* In that respect it is like the editorial on the value of the trolley car written by an editor down in Memphis, where they had a modernization parade like the one in Grand Rapids to celebrate the placing in service of 32 de luxe cars. And when rehabilitation is mentioned, don't forget the story of the come-back staged by the Steubenville, East Liverpool & Beaver Valley Traction Company, in which particular attention was paid to modernization of the rolling stock. So far as co-ordination of service goes Mr. Mitten seems to carry off the palm with cars, buses, taxis, airplanes and even a bank. Really the record of progress is astonishing. The late Elbert Hubbard said that if you want to know a subject write a book about it. Of course some one will arise to say that an optimist can always see the bright side of the other fellow's misfortune. Recalling some of the trying situations in this industry we are reminded that it is dangerous to tell a fat girl that she is "all wool and a yard wide." But no harm can come from thinking it just the same.

QUEEN MARIE MISSED A TREAT

Will Rogers had, of course, heard about the new Grand Rapids cars. All he knew about them until he visited Grand Rapids en tour in vaudeville early in December was what he had read in the newspapers. After he had looked them over on the ground he said:

"At that I didn't expect to find 'em quite so ritzy. You see, I couldn't forget those old splay-backed stubby ones they used to have when I was here 'way back before the war and used to do my stuff out to Ramona Theater at DeLamarter Lake. All I got to say is, Marie should'a seen 'em."

Will Rogers wasn't the only one to rub his eyes at the sight of the Grand Rapids cars in actual service. It is customary to cry loudly for a man of vision, and to call him visionary when we get him. The parade and the fanfare in Grand Rapids were more than justified. So were the similar celebrations in Memphis and Chattanooga.

Other instances of the application of new ideas in cars are supplied in the modernization of both interurban equipment and cars used in Akron, in the purchase of new cars by the Fitkin interests for use in Altoona, Scranton and Youngstown. Rolling stock improvements saved the small interurban described in the JOURNAL for Sept. 25, page 549. Similarly the installation of light-weight cars at Gary has been made to pay well. Toronto found modernization to be profitable. In fact, during the work of rehabilitation 490 cars have been scrapped there. Attractive cars put the Buffalo & Erie Railway on a paying basis. This road, which was a losing venture for sixteen years, is rapidly recovering its prestige with the aid of light-weight, one-man, speedy cars designed to attract passengers and reduce costs. Miami, Milwaukee, Chicago, Youngstown and many other cities went in for new cars on a large scale. A recapitulation of the situation in New York City made early in 1926 showed that the rapid transit lines here spent $9,000,000 in 1925 for car equipment. The Chicago Rapid Transit Company, operating the elevated lines, put on new cars with several features added that are intended to give greater comfort and convenience, although the new equipment is practically a duplicate of that already in service. As Charley Gordon said back in February, modern cars are not a panacea, but they are a step essential to the keeping of present business and the stimulation of riding. John A. Miller, Jr., discussed the value of new cars as proved by the experience of twenty railways in the JOURNAL for Sept. 25.

Still, habit is difficult to overcome. Remember the case of the retired colonel who had seen 40 years of active service who gave his body servant, long his orderly, explicit instructions:

Trainmen Are Becoming the Glass of Fashion and the Mold of Form

"Every morning, at 5 sharp, Sam, you are to wake me up, and say, 'Time for the parade, sir.'

"Then I'll say, 'Damn the parade!' and turn over and go to sleep again."

A lot of us, not only street railway men but many others, do not object to being reminded about life's parade, but we like to turn over and go to sleep again.

IT'S NOT THE QUESTION BUT THE ANSWER THAT'S BOTHERSOME

And it's something like this with the question of co-ordination. Many railway managers are like the boy at the college examination when the professor asked:

"Does my question embarrass you?"

"Not at all," said the boy. "It is quite clear. It is the answer that bothers me."

And it is the answer to co-ordination that bothers many railway men. In this connection good advice was given by B. W. Arnold, assistant general manager of the Chicago, North Shore & Milwaukee Railroad, when he urged the members of the Illinois Electric Railway Association at a meeting on March 17 to operate motor coaches for profit, not loss. He said that a pessimistic attitude toward the possibilities of motor coaches will inevitably result in loss. Too many railways have started bus operation with the thought in mind that the service must necessarily be run at a loss. Cincinnati appears to have tied in the bus effectively with its railway. In Cleveland more than 100 buses were tied in for operation with the lines of the Cleveland Railway in a period of six months. In New Jersey the bus business of the Public Service Transportation Company, affiliated with the Public Service Railway, has grown from 1,952,059 passengers in 1923 to 146,053,237 passengers in 1925. In New York City nearly all the railways are to be found among the more than 100 applicants for bus franchises now pending before the Board of Estimate. The Brooklyn companies alone want to run 77 miles of bus lines on twenty routes on a service-at-cost basis starting at a 5-cent fare. Even the interurban and the bus are being articulated, as R. H. Pinkley of the Milwaukee Electric Railway & Light Company pointed out at the Indianapolis meeting of the C.E.R.A. And so the evidence might be expanded almost at once.

With all due respect to others, no paper or discussion of the bus question during the year was more to the point than was the paper by Lord Ashfield presented at Cleveland. It was his contention, based on experience, mind you, that competition between electric lines and buses is wasteful, and should be abolished. All local service by surface cars, subways, buses and other conveyances, he maintains, should be rendered under single supervision. Some of the things he said are too significant not to be repeated. It will repay everybody concerned to read, mark, learn and inwardly digest this series of facts:

SOMETHING TO THINK ABOUT

"In Greater London the average speed of the underground trains is 18 m.p.h., including stops, or 24 m.p.h. where a limited number of stops only is made. Upon the tramways the average speed is 9.6 m.p.h., but upon the motor omnibuses in the built-up areas only 8.6 m.p.h. The speed of the operation of motor omnibuses has fallen owing to the combined effect of street congestion and restrictive legislation, and it is a matter of importance both to those who provide the streets and those who regulate them that a higher speed of operation should be secured for motor omnibuses straight away.

"The decline in speed tends to increase cost, for many elements of cost are determined on a time basis. It is another form of preventable waste. The average receipt per passenger upon the underground railways is 2.8d; upon the omnibus 1.8d and upon the tramways slightly less than 1.5d, but if the average cost of carrying a passenger is taken, it is found to be, upon the underground railways 2.1d, upon the omnibuses 1.5d and upon the tramways 1.3d, so that the margins, being the net receipts, left in respect of these three forms of transport are, respectively, 7d per passenger upon the underground railways, 2d per passenger upon the motor omnibuses and 0.15d per passenger upon tramways.

"So that their relative net earning capacity, if the railways are taken as 100, is 29 in the case of the omnibuses and 21 in the case of the tramways. If, then, the capital investment involved in the provision of these several forms of transport is investigated, it will be found that this capital represents an investment, per passenger carried in the year, of 34d in the case of underground railways, of 5d in the case of tramways, and of 1.5d in the case of motor omnibuses. Then if the net receipts per passenger are brought into relation to the capital expenditure, per passenger, it will be found that if motor omnibuses may this time be taken as 100, the economic capacity of the tramway is only 21, and of the underground railways, on account of their enormous capital expenditure, only 15."

Of course as an abstract question the laborer is worthy of his hire. But let him get it, some one rejoins. Yes, that's the point. But the railways haven't done so badly. The present average fare is 7.42 cents. Dallas finally came into its own in this respect, the city realizing that an advance in rates to 7 cents was imperative if extensions and improvements were to follow. In that case an arbitrary fare theory was broken and the franchise amended. Louisville also got a 7-cent fare and a new franchise. Fares on the Key System in Oakland were raised last January. An 8-cent fare went into effect in Rochester early in the year. In the JOURNAL for Jan. 23 John A. Dewhurst went over all the ground in the Philadelphia fare case. The fare matter remains unsettled in St. Louis. There the issue is tied in with the question of the new franchise and the reorganization. One of the big accomplishments of the year was the change in the terms of the Tayler franchise in Cleveland. The modified grant there was adopted after extended negotiations. The first important application of the service-at-cost idea was in that city. There was nothing the matter with the principle on which the grant was based, but the ordinance was inflexible. The new grant there runs until 1950 and raises the possible maximum fare to 10 cents instead of 6 cents, and it fixes the rate in contiguous suburbs 1 cent higher than the Cleveland rate. It also increases the barometer fare fund to a lower limit of $500,000 and an upper limit of $1,000,000.

In Kansas City the grant of the Kansas City Public Service Company has been extended another twelve years. Cincinnati began to operate under its new service-at-cost grant late in 1925. but it was not until 1926 that the first figures of results were available. They were favorable. In January Toledo began to talk about a new franchise. It is still talking, just as they are doing in Chicago, New York, Jacksonville, etc. Anyway, there certainly has been a lot more heat than light in the Chicago and New York situations. Mr. Insull blames politics for the Chicago situation. He's right. The same cause is at the root of the trouble in New York and most of the other cities, but lack of a united front on the part of transportation companies is a contributing factor.

As one reviews the political situation and sees the mess into which some of the cities have fallen because of the attitude of opposition and inaction by the governing bodies, one is reminded that some figure hound has said that the average politician's vocabulary consists of about 500 words. A small stock, indeed, but oh! what a turnover. Politicians remind you of Moses. Every time they open their mouths the bull rushes. That may not be elegant, but it is forceful. Indeed, one of these situations is so bad with respect to some of the personalities involved that the story is recalled about the rich man of Depew's acquaintance who went back to his home town for a visit.

"Is it really true," an old chum of his boyhood days inquired, "that you are getting $10,000 a year?"

"Why, yes," said the man addressed, "a good deal more than that."

"Well, b'gosh," said the questioner, "ain't it wonderful what gall and circumstance will do for a man."

For the benefit of those who are interested in the economics of the situation they are reminded that L. R. Nash discussed tendencies in regulation, franchise terms, taxes and rates of fare in the JOURNAL for June 5; that Louis E. Gettle, chairman of the Wisconsin Railroad Commission, discussed Wisconsin's experience with the indeterminate permit in the same issue, and that the Railroad Commissioners in annual convention in Asheville in the fall went on record in favor of this form of grant.

Somewhat akin to these problems was the fixing of the $77,000,000 valuation for the Baltimore property last March. The valuation principles which governed in the presentation of this case were made the subject of a series of articles contributed to the JOURNAL by the late W. H. Maltbie, counsel for the United Railways & Electric Company.

As usual there has been a lot of substitution talk. The most notable instances have been in New York and Chicago. Brief mention has been made before of the New York proposal. It was given a wrong angle by the newspapers, this substitution proposal, so much so that both the association and the JOURNAL urged transportation men to supply the facts to their communities. This was done because the newspaper comment reflected colossal misunderstanding on the part of the press not only of the New York conditions, but of the general transportation question. And speaking about informing the public, isn't that just what such letter writers are doing as Mr. Richardson in Chicago, Mr. Dahl in New York, Mr. Barnes in Louisville and Mr. Henderson in Seattle, each according to his light?

Apologies to the New York World.

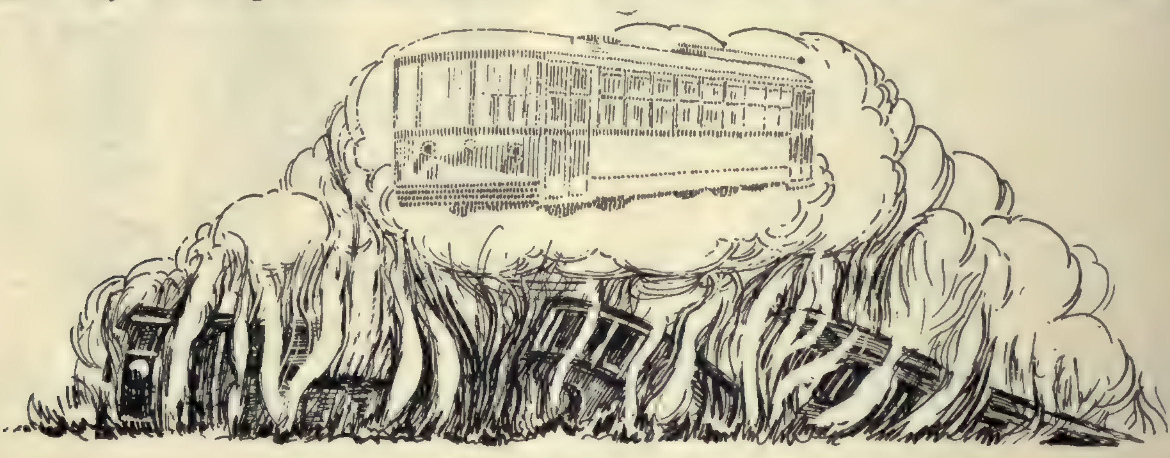
Informative Statements Are Helping in New York, Chicago, Seattle and Louisville

It was at the meeting of the Board of Estimate in New York in June that Mr. Dahl, the Brooklyn-Manhattan chairman, warned New York against scrapping its trolleys and declared that buses on anything but short routes could not be operated profitably for a 5-cent fare.

In London bus service was reduced to relieve congestion and to protect the tramways. Just as in New York, so the Berlin substitution program proved to be greatly magnified. An authoritative article in the JOURNAL at the time spiked this canard. Not only that, but the transportation expert who answered the inquiry said that if buses were substituted for cars in local service in Berlin the fares would have to be doubled.

OPERATING RATIO IS LOWER

Of course, the whole statistical record cannot be told, but it is of interest to reiterate the fact that details of operation from railways representing 90 per cent of the carrying capacity of the industry show an improvement in the net income. There was a slight decrease in traffic, but this was offset by lower operating costs and increased efficiency. The operating ratio in 1925 was slightly lower than in 1924. Most of the larger city systems did well. Chicago Surface Lines continued to handle record traffic. The Brooklyn-Manhattan Transit System reported record net and gross. This road has made a great financial comeback. It has been improved physically, too. Net for the year ended June 30, 1926, was $5,748,187. The measure of the success of the receivers of the Kansas City Railways in operating that property was shown by the fact that $5,000,000 was turned over to the special master by them at the termination of the receivership. The Chicago, North Shore & Milwaukee Railroad, probably the premier interurban electric railway of the world, reported an increase in net of $79,910. Right here it may not be amiss to mention a particularly outstanding achievement recorded in greater detail elsewhere in this issue. At the beginning of the last week before the Christmas holidays the Chicago Surface Lines succeeded in keeping every one of its 3,639 cars in operation. According to Professor Richey, writing in the JOURNAL for Feb. 13, ten-year statistics show that railways in large and small cities have had increases in revenue and traffic per inhabitant and show more economical use of cars.



Out of the Ashes of the Old Arises the New, Phoenix-Like

SOME SAD THINGS

Of course there were some sad things said during the year. There was Mr. Loree with his remark about the $6,000,000,000 investment in the electric railways being wiped off the books. My! what a stir that caused. Then there was Professor Ripley with his attack on the contents of most annual reports and his warning about holding companies. Apparently the professor holds to the opinion that scrambling the eggs doesn't help much if there is one bad one in the lot. ELECTRIC RAILWAY JOURNAL found itself in the company of the *Wall Street Journal* when it said that to publish a mass of technical and non-correlated facts is not to meet the stockholders' legitimate demands. The investment bankers feel very much the same way about it, as the JOURNAL for Oct. 23, page 776, records. As for the receivership record, that is shown elsewhere in this issue. The receivership of the Chicago Railways was unfortunate, but could hardly have been avoided under the circumstances. There is no default in this instance.

An unusual development in the wage situation of the year was the adoption by the Philadelphia Rapid Transit Company and its employees of a wage dependent on the purchasing power of money. The relations between management and men on the Philadelphia system have been most cordial under Mr. Mitten and on a co-operative basis. Jointly the men own about one-third of the common stock of the company. The wage schedule adopted in March, 1926, provided a reduction in the hourly wage scale, based on a reduced index of the cost of living, from 77 cents to 73½ cents. There were many other amicable adjustments of wage matters during the year, but there was strife in a few instances. The strike in Indianapolis assumed a serious aspect, very serious for the labor leaders who were sent to jail, but the strike in New York petered out quickly, as did the one in Akron.

ACCIDENT REDUCTION WORK GETS RESULTS

A feature of the year in legislation has been the consideration by Congress of a bill to control and regulate interstate bus carriers. A committee of the Interstate Commerce Commission conducted hearings in different parts of the country during the summer to secure evidence in regard to the need for such regulation and the form it should take. In most states where there is regulation of electric railway lines there is also state regulation of bus lines, but it has been held that the power of the state regulatory bodies over interstate bus lines is very limited.

Ever-increasing attention is being given to the matter of accident reduction. A part of this work has been done by safety campaigns among the public, as by posters, safety talks in the public schools and co-operation with state, municipal and civic bodies in the prevention of traffic accidents. Part of the result has come from educating the employees in accident prevention work and in stimulating them to greater efforts along these lines, in some cases by bonuses or other awards for immunity from accidents. The work naturally is one of slow progress, but gradual improvement is being made. Thus the joint committee on accident prevention of the American Electric Railway Transportation & Traffic and the Claims Association reported in October that 172 companies had shown a decrease of 3.25 per cent in the total number of accidents reported in 1925 as compared with 1924, and reduction of 5.42 per cent in total cost of claims, 147 companies reporting. On the basis of the reports of 145 companies, the average ratio of cost of accident to gross earnings fell from 3.12 per cent in 1924 to 3 per cent in 1925. As for the work of the Claims Association, the head for the account of the meeting of that body in the JOURNAL for Oct. 16 read: "Physicians and Surgeons Discuss Operating Problems." Quite appropriate! Quite appropriate!

SURVEYS OF STREET CONGESTION

Because of their use in the streets electric railways are keenly interested in all movements to reduce the street congestion and expedite the movement of traffic. For this reason steps taken to improve traffic conditions have the hearty co-operation of electric railways. Individually, also, many of them are helping in various ways to solve this problem, by conducting various traffic counts. Among the surveys made through the special assistance of the electric railways have been some to determine the proportion of shoppers at the principal department stores in a city who reach the store by trolley and by other means of transport. Surveys of this kind, it is believed, should be of assistance to the retail merchants of the city in helping them determine the policy as to the extent to which parking by automobiles should be permitted. Perhaps the most extensive survey of this kind conducted during the year was in Cleveland during three days in the early part of June, 1926, and the toll of customers was taken in 22 stores. They were not only the largest in Cleveland but represented a great diversity of goods sold. Each customer was interviewed and given a ballot as she or he entered the store on the day in question, the ticket being so arranged that a person could very easily indicate whether travel to the store by that individual was by bus, street car or private automobile or by water. A similar poll was taken among the employees of these stores, the result being travel by street cars 64.2 per cent, travel by private automobiles 21.8 per cent, travel by buses 10.1 per cent and walking 6.9 per cent.

In connection with the subject of accident reduction, greater attention is being given to the selection, training and periodical physical examination of motormen. Owing to the increasing use of one-man cars, this means that practically all transportation employees are concerned. A few companies give a physical examination to such employees of more than 50 years of age as often as once a year. The examinations of applicants for employment also include more attention to psychological tests than formerly, and at least two companies, those in Milwaukee and Philadelphia, have established extensive tests of this kind to govern the selection of trainmen.

Among the globe trotters of the year were W. H. Sawyer, shortly after his return from Australia elected president of the American Electric Railway Association, and Managing Director Storrs, who combined business with pleasure in a brief visit to Europe. How each of these men felt about it was, of course, duly recorded in the ELECTRIC RAILWAY JOURNAL. Another European observer was James A. Emery, vice-president of Ford, Bacon & Davis. Each of these men had something significant to say. It is certainly apparent that the British are on their toes with respect to improvements in railway rolling stock. More than 675 new cars were included by them in recent orders. Much reconstruction has been done to promote passenger comfort, notably on the London underground. The municipal managers in Great Britain are greatly excited over the inroads on their traffic by unregulated bus lines.

In the field of heavy electric railroading there were several very important events. On Aug. 7 the first train of the electrified suburban service on the Illinois Central Railroad of Chicago was run. The cost up to June 30, 1926, was $52,377,000, and it is expected that, compared with steam traction, about 12 per cent more suburban trains will be run, the passenger-carrying facilities will be increased about 6 per cent and train schedules will be speeded up from 7½ to 30 per cent. While the Staten Island Rapid Transit Company completed the electrification of its lines and began service with electricity as motive power on Dec. 24, the detailed account of the matter appeared in the JOURNAL for Jan. 2. Also in January the Long Island Railroad announced that $12,000,000 would be spent between 1926 and 1929 for electrification. Another significant installation is the application of electricity to 150 miles of the Piedmont & Northern Railroad at a cost of $15,000,000. The Skokie Valley route of the North Shore was completed and placed in service on June 5, one year almost to a day from the date construction was begun. This is a $10,000,000 installation. Similarly the so-called South Shore Line was completely rehabilitated. Construction of the rapid transit system in New York intended to be independently operated continues, but elsewhere, notably in Chicago, Pittsburgh, Cleveland, St. Louis and other cities, not much progress is to be reported with rapid transit projects.

There is nothing much new to recount about the municipal railway systems. Mr. Wallace, the manager of the Detroit system, is leaving on Jan. 1. Mr. Henderson is engaged in defending the local Seattle system from the attacks of a band of local taxpayers led by a Mr. Asia.

TIMES ARE CHANGED

But it is pretty near time to stop. No apologies appear to be needed for any of the things said. It might be well to explain that the journalist who does not interpret events as he sees them fails of his mission. Frequently he is misunderstood and maligned for his pains, but that is part of the price he pays. A natural optimist, he is forced at times to utter truths that estrange him from his contemporaries. A stern believer, he is often under suspicion. He is a prophet, but like the prophet he is often without honor in his own country. He consorts with kings, but is often rebuked for reproving them. He senses the debacle in advance of its coming, but is damned for his admissions. When change becomes a fact, he turns his attention to other things, for he is interested in the past only as it points the way to the future.

The changes of the past in this industry have merely reflected the changes in the outlook of the men responsible for them. Electric railway men of the past were good transportation men, but they saw only the electric car. They were good operators as operators go, but many of them failed quickly to appreciate the place of the bus. They lived in a world largely motivated by advertising, but they failed to appreciate the place that advertising plays in all merchandising. They wanted the best for themselves, but they failed to sense the same desire in others for modernization. They failed in some other ways, but they were not totally lacking in the desire to learn. And in that quality lies the seed of wisdom. Again is it well not to forget the Latin expression: *Tempora mutantur, nos et mutamur in illis.* Times change and we change with them. Never was this truer of an industry than it is today of the electric railway industry.

Increased Purchases Reflect Growing Interest in Car Improvement

Returns for Year Show Cumulative Activity in Purchases of Surface and Rapid Transit Passenger Equipment—Beginning of Comprehensive Replacement Program Evidenced by Increased Scrapping Rate—Buying of Standard Freight Cars Brings Interurban Totals Above Those for 1925

NEW ROLLING STOCK ORDERED DURING LAST FIVE YEARS

	Passenger Cars			Express, Freight, Service, Locomotives and Miscellaneous	Grand Total
Year	City	Interurban	Total		
1922	2,912	187	3,099	439	3,538
1923	2,915	427	3,342	687	4,029
1924	1,985	538	2,523	1,569	4,092
1925	1,054	320	1,374	285	1,659
1926	1,249	309	1,558	324	1,882

REPORTS of new rolling stock ordered during 1926 show that there has been a substantial increase in the total cars over the purchases in 1925, but the number of new cars still remains below replacement requirements. Cars are being scrapped at an increased rate and the total junked during 1926 about equals the number of new cars purchased. However, when analyzed carefully, the majority of the cars junked were used for city passenger service, so that the number of new cars purchased for this purpose appears to be entirely for replacement.

The statistics of new rolling stock given in the tables and charts herewith show that a total of 1,882 new cars and electric locomotives were ordered during 1926. This is an increase of 223 cars over the total of 1,659 bought in 1925; but the 1926 total is still less than half of the number purchased during either of the years 1923 or 1924. When analyzed in detail, the 1926 statistics show increases in the purchases of rapid transit cars, city surface passenger cars, freight cars and electric locomotives. There are slight decreases from the 1925 figures in the number of new interurban passenger cars purchased and in the total number of miscellaneous service cars bought.

Interest naturally centers in passenger car purchases. Comparisons for the two years show 932 city surface passenger cars bought during 1926, as compared with 894 in 1925; 317 rapid transit motor cars purchased during 1926 as compared with 160 during 1925; and 309 interurban passenger cars bought during 1926 as compared with 320 in 1925. The total purchases of interurban cars for all classes of service exceeds those of 1925 due to the inclusion of 186 standard freight cars, whereas only 155 freight cars were bought in 1925. Analysis of the number of miscellaneous, service and work cars, not including electric locomotives or freight cars, shows 66 purchased during 1926, as compared with 83 for 1925.

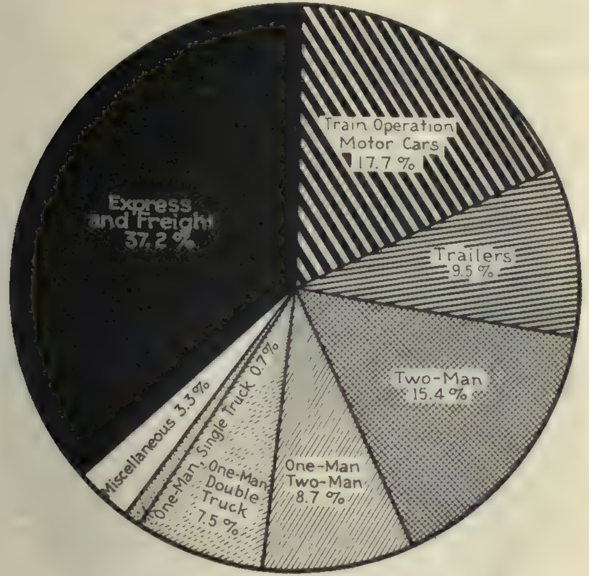
Special comparisons of new cars purchased during 1926 are given in table V. This shows that a total of 108 railways in the United States and Canada purchased new cars. This total is made up of 101 for the United States, one extraterritorial, and six for Canada. Of the cars purchased for city service, 574, or more than 44 per cent, were of the one-man, two-man type. Motor cars purchased for rapid transit service come next in the list with a total of 317, or nearly 25 per cent of the total city cars.

Straight one-man cars of all classes were bought in increased numbers as compared with 1925, there being a total of 210 purchased during 1926. Of these 66 were single-truck cars with 28-ft. bodies, 23 were single-truck cars with bodies longer than 28 ft. and 121 were double-truck cars. The total one-man cars purchased represents approximately 16 per cent of the total cars purchased for city service. One-man, two-man cars for city service total 574. The number of city cars designated as two-man type purchased during 1926 was 139, but of course many of the cars in the one-man, two-man class are used with two men during high peak periods.

Just what types of cars are being bought in greatest proportion, both of city and of interurban types, are shown in graphic form in diagrams on pages 21 and 22. The analysis of interurban cars purchased shows that freight cars are in the lead. Of the interurban passenger cars those purchased for train operation were more numerous, there being 92 motor cars and 49 trailers, or a total of 141 interurban cars of these types. Next in the interurban passenger car classification come 80 of the two-man type. There were 45 one-man, two-man interurban cars and 43 one-man cars. The diagram which shows the proportions of each class indicates that more than 37 per cent of the total interurban cars are for freight service. This large number of freight car orders is due unquestionably to the adoption of the standard design originated by the Central Electric Railway Master Mechanics' Association. Railways in the Central States were in need of added freight equipment and the bringing out of this standard design stimulated sales.

In order to show the rise and fall in popularity of the one-man car a special chart has been prepared. One-man single-truck cars with 28-ft. bodies, the original safety cars, first made their appearance in 1916. This type increased in popularity up to 1920, when a total of 1,699 were purchased. Since that time the number has decreased rapidly. During 1926 only 70 cars of this type were purchased. Single-truck cars with bodies longer than 28 ft. were purchased in greatest numbers in 1922, and since then the number has fallen off and one-man, two-man cars have been increasing in popularity. The total of 574 of the latter type, which were purchased during 1926 for city service, is greater than for the years 1922 and 1925, but only about half those purchased during 1923 and 1924.

There were 22 electric railways that ordered twenty or more cars during 1926, an increase over 1925, which shows but seventeen such railways. Of these 22 roads the Philadelphia Rapid Transit Company ordered 150 rapid transit motor cars and 50 city double-truck motor cars. The Boston Elevated Railway purchased 100 city rapid transit motor cars, nine work cars and four sweepers. Other large purchases of rapid transit cars included the Brooklyn-Manhattan Transit Corporation, which ordered 67 rapid transit articulated cars, each consisting of three bodies on four trucks; twelve freight cars, and a supply car. The Long Island Railroad purchased 60 suburban motor cars and 30 trailers for train service, and the New York, New Haven & Hartford Railroad purchased twelve motor cars and fifteen trailers for suburban electric train operation. The New York, Westchester & Boston Railway and the Pennsylvania Railroad each purchased twenty motor cars for use in suburban passenger train service.



This Shows the Various Types of Interurban Cars Purchased Last Year as a Per Cent of the Total for This Class

Of the railways to purchase cars for surface city passenger service, the Chicago Surface Lines obtained the greatest number, 100 motor cars. The Georgia Railway & Power Company purchased 60 city motor cars and ten interurban motor cars. The Montreal Tramways and the Pittsburgh Railways each purchased 50 motor cars for city service.

Table I—New Rolling Stock Ordered Since 1907

Year	Passenger Cars City	Passenger Cars Interurban	Freight and Miscellaneous Cars	Electric Locomotives	Total
1907	3,483	1,327	1,406	(a)	6,216
1908	2,208	727	176	(a)	3,111
1909	2,537	1,245	1,175	(a)	4,957
1910	3,571	990	820	(a)	5,381
1911	2,884	626	505	(a)	4,015
1912	4,531	783	687	(a)	6,001
1913	3,820	547	1,147	(a)	5,514
1914	2,147	384	479	(a)	3,010
1915	2,072	336	374	(a)	2,782
1916	3,046	374	491	31	3,942
1917	1,998	185	223	49	2,455
1918	1,842	255	278	44	2,419
1919	2,129	128	172	18	2,447
1920	2,889	227	465	17	3,598
1921	1,059	129	81	7	1,276
1922	2,912	187	405	34	3,538
1923	2,915	427	595	92	4,029
1924	1,985	538	1,538	31	4,092
1925	1,054	320	238	47	1,659
1926	1,249	309	264	60	1,882

(a) Included in "Freight and Miscellaneous Cars."

As regards large purchases of cars, there were three companies that bought 100 or more cars in 1926, while there were six that purchased a total of 100 or more cars in 1925.

Details of rolling stock ordered by individual companies are given in Table VII which follows this article on pages 25, 26 and 27. The arrangement of this table is the same as that used in preceding years. The railways are arranged alphabetically, according to states. The United States is then grouped into five geographical divisions, while the Dominion of Canada and territories outside of continental United States are each grouped separately. In addition to listing the number of cars ordered by companies, the table shows the class of car and type of service. It also gives data as to length, seating capacity, weight and number of motors.

As in past years the states of Pennsylvania, Ohio and New York lead in the total number of cars purchased, there being 326 reported for Pennsylvania, 252 for Ohio and 215 for New York. In Pennsylvania the cars are mostly for city service, there being 291 city cars and but 35 interurban cars. In both Ohio and New York the interurban car totals exceeded those for city service, Ohio having 176 interurban cars and 76 city cars, while New York has 119 interurban cars and 96 city cars.

Multiple-bodied articulated cars are being used in increasing numbers for service where a large number of passengers must be carried. Three companies report the purchase of 89 units of this type. Of these units, 67 purchased by the Brooklyn-Manhattan Corporation

Table II—Special Comparison of New Rolling Stock Ordered by Years

	1926	1925	1924	1923	1922	1921	1920	1919	1918	1917	1916
Number of railways reporting new cars	108	94	119	167	145	94	172	160	140	182	250
City Service											
Number of one-man cars (28-ft. body S. T.)	66	55	103	312	772	565	1,699	1,383	644	280	187
Number of one-man cars other than 28-ft. body	144	74	96	183	227	.....	.....	.....	.....	.....	.....
Number of one-man, two-man cars	574	512	1,224	1,076	471	.....	.....	.....	.....	.....	.....
Number of two-man passenger motor cars*	456	405	537	1,097	1,290	383	847	635	1,068	1,316	2,731
Number of passenger trailers	9	8	25	247	150	111	343	111	130	402	128
Service cars	52	70	44	121	103	47	104	31	(a)	(a)	(a)
Total cars city service	1,301	1,124	2,029	3,036	3,015	1,106	2,993	2,160	1,842	1,998	3,046
Interurban Service											
Number of one-man cars	43	3	61	56	40	.....	.....	.....	.....	.....	.....
Number of one-man, two-man cars	45	70	38	38	9	.....	.....	.....	.....	.....	.....
Number of two-man motor cars*	172	207	435	330	122	103	195	96	200	158	303
Number of passenger trailers	49	40	4	3	16	26	32	32	55	27	71
Number of freight, express and miscellaneous cars	212	168	1,494	474	302	34	361	141	(a)	(a)	(a)
Total cars interurban service	521	488	2,032	901	489	163	588	269	255	185	374
Total number of cars	1,822	1,612	4,061	3,937	3,538	1,269	3,581	2,429	2,375	2,406	3,911
Number of electric locomotives	60	47	31	92	34	7	17	18	44	49	31

* Includes motor and trail cars for subway, elevated and train service. (a) Not available.

Table III—Companies Purchasing 20 or More Passenger Cars

Philadelphia Rapid Transit Co.	150	rapid transit motor cars and 50 city motor cars
Boston Elevated Railway	100	city rapid transit motor cars, 9 work cars and 4 sweepers
Chicago Surface Lines	100	city motor cars
Long Island R.R.	60	interurban motor cars and 30 interurban trailers
Brooklyn - Manhattan Transit Corp.	67	rapid transit articulated cars each with 3 bodies on 4 trucks, 12 freight cars and 1 supply car
Georgia Ry. & Power Co.	60	city motor cars and 10 interurban motor cars
Cincinnati, Hamilton & Dayton Ry.	16	city motor cars, 10 interurban motor cars and 40 freight cars
Montreal Tramways	50	city motor cars
Pittsburgh Railways	50	city motor cars
Ohio Valley Electric Ry.	46	city motor cars
Milwaukee Elec. Ry. & Lt. Co.	40	city motor cars and 4 sweepers
Dallas Ry. & Terminal Co.	30	city motor cars and 2 work cars
Memphis Street Railway	32	city motor cars
Market Street Railway	29	city motor cars and 2 cable cars
Arkansas Power & Lt. Co.	30	city motor cars
Virginia Elec. & Power Co.	30	city motor cars
Chicago, South Shore & South Bend Railroad	25	interurban motor cars, 2 parlor cars and 2 dining cars
New York, New Haven & Hartford Railroad	12	interurban motor cars and 15 trailers for train operation
Hamilton Street Railway	24	city motor cars
Columbus Ry., Pwr. & Lt. Co.	23	city motor cars
N. Y., Westchester & Boston Ry.	20	interurban motor cars
Pennsylvania Railroad	20	interurban motor cars

each consist of three bodies on four trucks; twelve units constructed by the United Railways & Electric Company of Baltimore consist of two bodies on three trucks, and ten units purchased by the Washington, Baltimore & Annapolis Electric Railroad consist of two bodies on three trucks.

Purchases of electric locomotives during 1926 are listed in Table IV. The total number of new electric locomotives is 60 as compared with 47 purchased during 1925. The Pennsylvania Railroad was the largest purchaser, ordering 21 locomotives of 192 tons and two of 150 tons. The remaining 37 electric locomotives purchased were divided among twelve companies.

For convenience in comparing rolling stock purchases during the past twenty years and in order to show at a glance the quantities of cars purchased as divided between city and interurban passenger cars and freight, express, service and miscellaneous cars, Table I gives the total number of cars ordered each year beginning with 1907. Rolling stock purchases are divided into four classes: First, city passenger cars; second, interurban passenger cars; third, freight, express and miscellaneous cars, and fourth, electric locomotives. In this classification cars for electrified steam railroad suburban service are included with interurban cars. The miscellaneous cars include service cars, snow plows, sweepers, work cars, etc.

Table IV—Electric Locomotives Ordered During 1926

Name of Railway	Number	Weight, Tons	Length Over All, Ft. In.
New England States			
New York, New Haven & Hartford R.R.	5	180.00	68—6
	3	90.00	37—6
Eastern States			
Baltimore & Ohio R.R.	2	120.00	39—6
Long Island R.R.	7	150.00	......
	1	25.00	......
New York Central R.R.	1	125.00	43—6
Pennsylvania R.R.	2	150.00	......
	21	192.00	65—2½
Central States			
Chicago, Aurora & Elgin R.R.	2	50.00	......
Chicago, South Shore & South Bend R.R.	4	80.00	40—0
Cincinnati, Georgetown & Portsmouth R.R.	1	53.50	40—2½
Great Northern Ry.	2	255.00	73—9
Illinois Traction System	6	80.00	......
Toledo & Western Ry.	1	60.00	37—4
Extraterritorial			
Havana Central R.R.	1	60.00	37—4
Canada			
Canadian National Ry.	1	68.00	......
Total	60		

In addition to this table, the trend of purchases is shown by graphs. Three of these on one diagram show the new cars ordered each year beginning with 1907. One gives the total number of cars and electric locomotives, the second gives passenger cars for city service and the third interurban cars for passenger service. The number of passenger cars bought for city service decreased from 1923 to 1925. The number for 1926 with a total of 1,249 is lower than any other years except 1921 and 1925. Purchases of interurban cars increased from 1921 to 1924. Since then the number has decreased, there being but 320 reported in 1925 and but 309 in 1926.

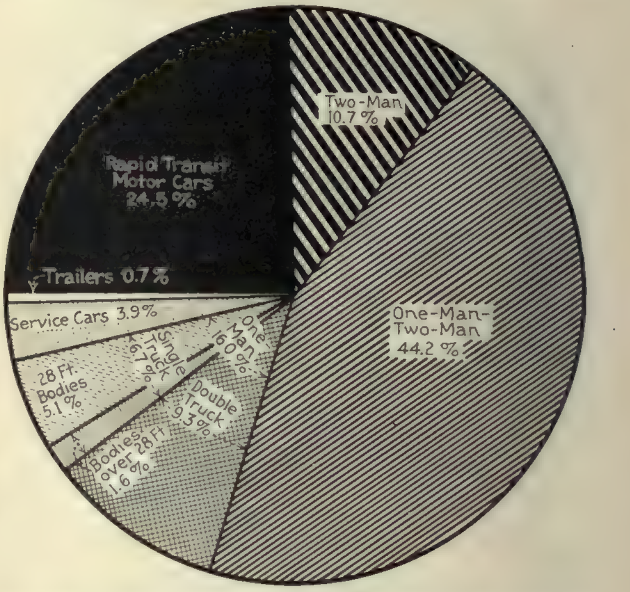
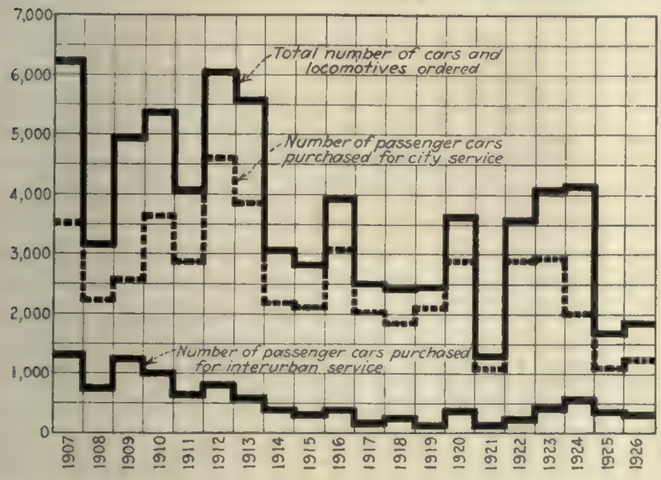


Diagram Showing the Proportion of Total City Cars for Each Type Purchased in 1926

A special comparison of cars ordered during the past eleven years is given in Table II. Cars are listed separately for city and interurban service and each class divides the various cars according to type. It is interesting to note how the number of safety cars purchased has increased each year from 1916 up to and including 1920 and during the same period how the number of large two-man cars has decreased. One-man, two-man cars first made their appearance in 1922 and since that time this type of car has proved most popular for city service. These changes in types of cars ordered have been discussed in connection with the several classifications.

In Table V a recapitulation is given by districts of cars ordered during 1926. This shows that the greatest purchases of rolling stock were in the Eastern and Central States, while the Western States purchased comparatively few. The purchases during 1926 classified by districts follow in the same order as for the year 1925. During 1924 the Western States showed the greatest number of cars purchased, there being eighteen companies in the Western States that reported a total of 1,663 cars and locomotives bought for city and interurban service. This is nearly as many as the total number reported for 1926, in all states. Car purchases during 1926, arranged by districts in the order of the number bought, show 669 cars purchased for city and interurban service in the Eastern States, 524 cars in the Central States, 224 cars in the Southern States, 180 in the New England States and 108 cars in the Western States. The Dominion of Canada reported a total of 111 cars, all for city service.

By analyzing the various one-man, two-man cars ordered for city service during 1926, it is seen that they run quite uniform in length, weight and seating capacity. Length varies from 37 ft. 6 in. to 46 ft. 2 in. and weight from 12.35 tons to 19.50 tons. In analyzing the essential details of cars of this class, the 100 multiple-unit cars ordered by the Chicago Surface Lines have not been included, since these are primarily for heavy city train service. For that reason they are larger and of heavier capacity than the ordinary one-man, two-man car required for city service. Consequently it is considered that these cars do not represent what can properly be described as a one-man, two-man car in size and weight. The weighted average for all cars of the one-man, two-man type purchased during 1926, exclusive of the Chicago cars, gives a length of 43 ft. 5 in. and a weight of 17.36 tons.



Graphical Analysis of Total Cars and Locomotives and Passenger Cars for City and Interurban Purchased During Past Twenty Years

It is interesting to compare these average dimensions with similar ones for the city cars as proposed by the A.E.R.A. committee on essential features of modern cars, published in ELECTRIC RAILWAY JOURNAL for June 26, 1926. This committee gave three sizes of one-man, two-man double-end city cars, identical except for the number of windows included in the body. The ten-window body has a length over bumpers of 39 ft. 7¼ in., the eleven-window body a length of 42 ft. 1 in. and the twelve-window body a length of 44 ft. 6½ in. The weighted average of length for cars purchased during 1926, 43 ft. 5 in., falls between that of the eleven and twelve-window cars, which would seem to indicate that cars of these two sizes would meet most conditions. Of the cars reported in the 1926 statistics, there was but one order for cars of a length shorter than the shortest car proposed by the A.E.R.A. committee. This was for 13 cars purchased by the Southern Indiana Gas & Electric Company, the length of these cars being 37 ft. 6 in. and weight 12.35 tons. Of cars longer than the 44 ft. 6½ in. recommended for the longest car by the A.E.R.A. committee, there were fourteen cars purchased which were 45 ft. long; 73 cars which were 45 ft. 4 in. long; two cars which were 45 ft. 8 in. long; 30 cars which were 45 ft. 9 in. long; 32 cars which were 46 ft. 2 in., and ten cars which were 47 ft. long.

Table V—Recapitulation by Districts of Cars Ordered During 1926

	New England States	Eastern States	Central States	Southern States	Western States	Extraterritorial	Total for United States	Total for Canada	Grand Total
Number of companies reporting purchase of new cars...	12	33	35	14	7	1	102	6	108
City Service									
One-man cars, 28-ft. body....	...	9	16	36	...	..	61	5	66
One-man cars, with bodies longer than 28 ft.									
Single truck............	...	10	...	13	...	..	23	...	23
Double truck............	...	46	60	15	...	..	121	...	121
One-man, two-man cars.....	10	138	164	148	40	..	500	74	574
Two-man cars (surface).....	...	62	1	...	46	6	115	24	139
Motor cars for rapid transit lines..................	100	217	...	...	...	..	317	...	317
Trailers..................	...	...	...	...	5	..	5	4	9
Service and miscellaneous cars	15	21	7	2	3	..	48	4	52
Total cars, city service....	125	503	248	214	94	6	1,190	111	1,301
Interurban Service									
One-man, single truck cars..	...	4	...	...	...	..	4	...	4
One-man, double-truck cars.	...	4	35	...	...	..	39	...	39
One-man, two-man cars.....	22	5	8	10	...	..	45	...	45
Two-man cars.............	6	30	40	...	4	..	80	...	80
Trailers..................	15	30	4	...	...	..	49	...	49
Motor cars for train service..	12	80	...	...	...	..	92	...	92
Express and freight cars.....	...	8	187	...	...	..	195	...	195
Miscellaneous cars..........	...	5	2	...	10	..	17	...	17
Total cars interurban service	55	166	276	10	14	..	521	...	521
Electric locomotives........	8	34	16	...	...	1	59	1	60
Total cars and electric locomotives..............	188	703	540	224	108	7	1,770	112	1,882

In regard to weight, the weighted average for the cars purchased during 1926 is 17.36 tons, which also falls within the weights given for the eleven and twelve-window cars. The recommended weights are respectively 15.6 tons and 18.5 tons. Corresponding weighted averages for cars of the one-man, two-man class purchased during the year 1925 were given in the Jan. 2, 1926, issue of ELECTRIC RAILWAY JOURNAL, the length being 44 ft. 1 in. and weight 18.07 tons. It thus appears that the tendency during 1926 was to use a car for one-man, two-man service slightly smaller in size than those purchased during 1925.

In general design cars of this class have remained about the same for the last three years. Wheels of 26 in. diameter are used most commonly, and platforms are either at the level of the car floor or with a slight ramp. A single intermediate step is used between the roadway and the car platform. Arch-type roof construction is used most generally. All of these charac-

Table VI—Freight Cars Ordered During 1926

Name of Railway	Number
Cincinnati, Hamilton & Dayton Ry..................	40
Northern Ohio Power & Light Co..................	27
Lake Shore Electric Ry..................	20
Union Traction Company of Indiana..................	20
Indiana, Columbus & Eastern Traction Co..................	15
Michigan R.R..................	15
Brooklyn-Manhattan Transit Corp..................	12
Pennsylvania-Ohio Electric Co..................	10
Toledo, Bowling Green & Southern Traction Co..................	10
Toledo, Fostoria & Findlay Ry..................	10
Western Ohio Ry..................	10
Cleveland Southwestern Railway & Light Co..................	5
West Penn. Rys..................	3
Indiana Service Corp..................	1
Total..................	198

Table VII—Details of Rolling Stock Ordered During 1926

Name of Company	No.	Class	City or Interurban	Motor or Trailer	Single or Double Truck	Length Over All Ft. In.	Total Wt. Light Tons	No. Motors	Seating Capacity	One or Two Man	No. Cars Junked During Year
New England States											
Connecticut											
Connecticut Co.	1	Crane	Construct.	Motor	Double	42— 0	32.70	4			28 CSM 20 CDM
New York, New Haven & Hartford R.R.	12	Passenger	Interurban	Motor	Double	80— 1½	88.00	4	120	Train	
	15	Passenger	Interurban	Trailer	Double	80— 1½	51.80		120	Train	
Maine											
Bangor Hydro-Electric Co.											1 IDM
Massachusetts											
Berkshire Street Ry.	12	Passenger	Interurban	Motor	Double	48—10	18.60	4	50	Both	
Boston Elevated Ry.	100	Passenger	City	Motor	Double	46— 7½	34.50	2	48	Train	42 CP 12 IS
	9	Work	Construct.	Motor	Double	40— 0	23.00	4			
	4	Sweeper	City	Motor	Double	39— 0	26.00	4			
East Taunton Street Ry.	2	Passenger	Interurban	Motor	Double	36—10	13.96	4	44	Both	1 IP
Eastern Massachusetts Street Ry.	1	Snow Plow	Both	Motor	Double	43— 0	25.00				92 CDM 27 CSM 22 IDM
Fitchburg & Leominster Street Ry.	4	Passenger	Interurban	Motor	Double	36—10	20.00	4	40	Both	
Gardner-Templeton Street Ry.											14 CM
Greenfield-Montague Transp. Area.	2	Passenger	Interurban	Motor	Double	39— 1¼		4	44	Both	
Interstate Street Ry.	2	Passenger	Interurban	Motor	Double	40— 3	16.10	4	44	Both	
Plymouth & Brockton Street Ry.											6 CDM
Springfield Street Ry.											1 CSM 2 CDM
Rhode Island											
United Electric Rys.	10	Passenger	City	Motor	Double	41— 0	15.50	4	38	Both	
Vermont											
Springfield Terminal Ry.	2	Passenger	Interurban	Motor	Double	41— 6	18.00	4	48	Two	2 CP
Vergennes Power Co.	4	Passenger	Interurban	Motor	Double	45— 0	15.00	4	48	Two	4 CSM
Total cars New England States	180										
Eastern States											
District of Columbia											
Capital Traction Co.											115 CST 6 CSM
Washington Railway & Electric Co.	15	Passenger	City	Motor	Double	42—3	20.10	4	49	One	25 CDM
	1	Work	Both	Motor	Double	42—11	20.00	4			
Washington-Virginia Ry.											6 IDM 5 IDT
Maryland											
Potomac Edison Co.	2	Passenger	City	Motor	Double	40— 0	15.92	4	38	Both	
	1	Passenger	City	Motor	Single	28— 0½	8.83	2	32	One	
United Railways & Electric Co	12	Passenger	City	Motor	*Three	74—10	33.80	4	87	Two	35 CSM
Washington, Baltimore & Annapolis Elec. R.R.	10	Passenger	Interurban	Motor	*Three	94— 7	59.00	4	94	Two	
New Jersey											
Coast Cities Ry.											8 CDM 42 CSDO
Cumberland Traction Co.	2	Passenger	Interurban	Motor	Double	48— 0	20.00	4	44	One	
Trenton & Mercer County Traction Corp.	3	Sweepers	City	Motor	Double			4			
New York											
Batavia Traction Co.	1	Passenger	City	Motor	Double			2	42	One	
Brooklyn City R.R.	1	Crane	Construct	Motor	Double	44—0	33.50	4			
Brooklyn-Manhattan Transit Corp.	67*	Passenger	City	Motor	*Four	137—0		4	160	Two	
	12	Freight	City	Trailer							71 CM
	1	Supply	City	Motor	Double	48—0	30.00	4			
Chautauqua Traction Co.											11 CDM
Eastern New York Utilities Corp.	2	Passenger	Interurban	Motor	Double	41—3	19.00	4	44	Both	
Ithaca Traction Corp.	4	Passenger	City	Motor	Single	29— 8½		2	32	Both	
Jamestown Street Ry.	8	Passenger	City	Motor	Single	27— 7	9.50	2	30	One	
Long Island R.R.	60	Passenger	Interurban	Motor	Double		57.35	2	78	Train	
	30	Passenger	Interurban	Trailer	Double		35.00		80	Train	
	5	Caboose	Interurban	Trailer			19.00				
New York & Stamford Ry.											24 IDM
New York State Rys.	1	Dump	Construct	Motor	Double	40—0	25.00	4			
	1	Dump	Construct	Trailer	Double	40— 0	17.00				
New York, Westchester & Boston Ry.	20	Passenger	Interurban	Motor	Double	72— 06	63.45	2	80	Two	
Olean, Bradford & Salamanca Ry.											1 IDM
Richmond Light & R.R. Co.											30 CDM
Schenectady Ry.	2	Work	City	Motor	Double	40— 0	25.00	4			
Pennsylvania											
Conestoga Traction Co.	6	Passenger	City	Motor	Single	31— 0	9.00	2	30	One	
East Taunton Street Rwy.	2	Passenger	Interurban	Motor	Double	38— 0	14.00	4	40	One	
Jefferson Traction Co.											1 C 2 I
Pennsylvania R.R.	20	Passenger	Interurban	Motor	Double	64— 0	61.50	2	72	Train	
Philadelphia Rapid Transit Co.	150	Passenger	City	Motor	Double			2		Train	50 CDM
Pittsburgh Rys.	50	Passenger	City	Motor	Double	45— 6	18.47	4	48	Two	
	50	Passenger	City	Motor	Double	45— 4	19.00	4	52	Both	
Reading Transit Co.	4	Passenger	City	Motor	Double	45— 0	16.85	4	46	Both	
Scranton Ry.	12	Passenger	City	Motor	Double	41—10	18.00	4	44	Both	55 CSM
Sunbury & Selinsgrove Ry.	3	Passenger	Both	Motor	Double	40— 3	14.00	4	50	Both	
Tarentum, Breckenridge & Butler Street Ry.	4	Passenger	Interurban	Motor	Single			2	28	One	
United Traction Street Ry.											2 CDM 3 CM 3 ISM 4 IM
West Penn Rys.	3	Freight	Interurban	Motor	Double	50— 0	21.00	4			
	1	Flat car	Interurban	Trailer	Single	20— 0	4.00				20 CSM
	2	Line cars	Interurban	Motor	Double	45— 0	21.00	4			
Westside Electric Street Ry.	3	Passenger	City	Motor	Double	41— 2	17.53	4	46	Both	
Williamsport Passenger Ry.	5	Passenger	City	Motor	Double	42— 2	16.00	4	44	Both	
Wilkes-Barre Ry.	1	Snow plow	Both	Motor	Single	28— 0		2			
	10	Passenger	City	Motor	Double	45— 0		4		Both	
Virginia											
Roanoke Ry. & Electric Co.	6	Passenger	City	Motor	Double	41— 4	17.50	4	44	Both	
Virginia Electric & Power Co.	30	Passenger	City	Motor	Double	40— 0	16.00	4	44	One	74 CSM
West Virginia											
Ohio Valley Electric Ry.	46	Passenger	City	Motor	Double	44— 0	18.00	4	48	Both	
Total cars Eastern States	669										

*Three-section units.

Table VII—Details of Rolling Stock Ordered During 1926—(Continued)

Name of Company	No.	Class	City or Interurban	Motor or Trailer	Single or Double Truck	Length Over All Ft. In.	Total Wt. Light Tons	No. Motors	Seating Capacity	One or Two Man	No. Cars Junked During Year
Central States											
Illinois											
Aurora, Elgin & Fox River Electric Co.	8	Passenger	City	Motor	Single	28— 0½	9.03	2	32	One	....
Chicago, North Shore & Milwaukee R.R.	4	Caboose	Interurban	Trailer	Double	34—10	27.00	....	....	....	2 IF 1 IP
Chicago Surface Lines	100	Passenger	City	Motor	Double	48—11	20.65	2	51	Both	....
Chicago & Joliet Electric Ry.	4	Passenger	Interurban	Motor	Double	46— 2	19.25	4	48	One	....
	6	Passenger	Interurban	Motor	Double	46— 2	19.25	4	52	One	....
Illinois Power Co.	....	....	....	....	....	....	....	....	....	....	4 CSM
Illinois Power & Light Corp.	....	....	....	....	....	....	....	....	....	....	61 CP
Indiana											
Chicago, South Shore & South Bend R.R.	25	Passenger	Interurban	Motor	Double	60— 0	57.00	4	42	Two	....
	2	Parlor	Interurban	Trailer	Double	60— 0	....	....	....	....	....
	2	Dining	Interurban	Trailer	Double	60— 0	....	....	....	....	....
Gary Railways	12	Passenger	Interurban	Motor	Double	44— 0	28.75	4	44	One	....
Gary & Hobart Traction Co.	3	Passenger	Interurban	Motor	Double	44— 8½	21.25	4	44	Two	....
Indiana Service Corp.	1	Freight	Interurban	Motor	Double	52— 0	32.00	4	....	....	....
	1	Work	Interurban	Trailer	Double	52— 0	18.00	....	....	....	....
Southern Indiana Gas & Electric Co.	4	Passenger	Interurban	Motor	Double	40— 3	17.00	4	44	One	....
	13	Passenger	City	Motor	Double	37— 6	12.35	4	44	Both	....
Union Traction Company of Indiana	20	Freight	Interurban	Trailer	Double	49— 8	21.25	....	....	....	....
Kentucky											
Kentucky Traction & Terminal Co.	1	Passenger	Interurban	Motor	Double	40— 3	14.00	4	44	One	....
Louisville Ry	....	....	....	....	....	....	....	....	....	....	13 CDM 3 CST
Michigan											
Department of Street Rys. (Detroit)	....	....	....	....	....	....	....	....	....	....	14 CDM
Detroit United Ry.	....	....	....	....	....	....	....	....	....	....	1 CDM 1 F 1 IDM
Grand Rapids Ry.	....	....	....	....	....	....	....	....	....	....	6 CDM
Menominee & Marinette Light & Traction Co.	....	....	....	....	....	....	....	....	....	....	1 CSM
Michigan R.R.	15	Freight	Interurban	Trailer	Double	49— 8	21.50	....	....	....	....
Muskegon Traction & Light Co.	2	Passenger	City	Motor	Double	....	16.50	4	....	One	....
Minnesota											
Mesaba Ry.	....	....	....	....	....	....	....	....	....	....	2 IDM
Twin City Rapid Transit Co.	1	Crane	Construct	Motor	Double	44— 0	35.00	4	....	....	....
Missouri											
City Light & Traction Co.	....	....	....	....	....	....	....	....	....	....	1 CP
Missouri Power & Light Co.	....	....	....	....	....	....	....	....	....	....	1 CP
St. Joseph Light, Heat & Power Co.	....	....	....	....	....	....	....	....	....	....	36 CM
United Rys. (St. Louis)	....	....	....	....	....	....	....	....	....	....	18 CDM
Ohio											
Cincinnati, Hamilton & Dayton Ry.	6	Passenger	City	Motor	Single	28— 1½	8.00	2	32	One	....
	10	Passenger	City	Motor	Double	39— 8	14.75	4	47	Both	....
	7	Passenger	Interurban	Motor	Double	53— 9	28.75	4	50	Two	....
	3	Passenger	Interurban	Motor	Double	52— 2	30.00	4	52	Two	....
	40	Freight	Interurban	Trailer	Double	49— 8	21.20	....	....	....	....
Cincinnati Street Ry.	5	Passenger	City	Motor	Double	39— 8	13.25	4	49	One	23 CSM
Cleveland Ry.	1	Passenger	City	Motor	Double	51— 2	16.40	4	56	Two	59 CDM
	1	Concrete Breaker	City	Motor	Single	24— 0	10.00	1	....	....	....
Cleveland Southwestern Ry. & Light Co.	5	Freight	Interurban	Trailer	Double	54— 3	40.00	....	....	....	....
Columbus, Delaware & Marion Electric Co.	2	Parlor	Interurban	Motor	Double	62— 0	47.50	4	36	Two	....
Columbus Railway, Power & Light Co.	23	Passenger	City	Motor	Double	45— 3½	18.31	4	48	Both	....
Columbus, Urbana & Western Electric Ry.	....	....	....	....	....	....	....	....	....	....	3 I
Indiana, Columbus & Eastern Traction Co.	15	Freight	Interurban	Trailer	Double	36— 0	21.20	....	....	....	....
Lake Shore Electric Ry.	20	Freight	Interurban	Trailer	Double	36— 0	21.20	....	....	....	....
Nelsonville Electric Ry.	....	....	....	....	....	....	....	....	....	....	1 IDM
Northern Ohio Power & Light Co.	1	Dump	Construct	Trailer	Double	40— 0	25.00	....	....	....	30 CDM
	25	Freight	Interurban	Trailer	Double	49— 8	21.50	....	....	....	....
	2	Freight	Interurban	Motor	Double	52— 4	35.75	....	....	....	....
Pennsylvania-Ohio Electric Co.	10	Freight	Interurban	Trailer	Double	49— 8	21.20	....	....	....	12 IDM
	13	Passenger	City	Motor	Double	49— 0	16.06	4	44	One	....
Portsmouth Public Service Co.	3	Passenger	City	Motor	Double	42—11	13.40	4	55	Both	....
Stark Electric R.R.	8	Passenger	Interurban	Motor	Double	47— 0	16.00	4	54	One	5 IDM
Steubenville, East Liverpool & Beaver Valley Traction Co.	8	Passenger	Interurban	Motor	Double	48— 0	23.00	4	51	Both	....
Toledo, Bowling Green & Southern Traction Co.	10	Freight	Interurban	Trailer	Double	49— 8	21.20	....	....	....	....
Toledo Edison Co.	1	Dump	Construct	Trailer	Double	40— 0	17.00	....	....	....	....
Toledo, Fostoria & Findlay Ry.	10	Freight	Interurban	Trailer	Double	36— 0	21.20	....	....	....	....
Western Ohio Ry.	10	Freight	Interurban	Trailer	Double	49— 8	21.50	....	....	....	....
Youngstown Municipal Ry.	13	Passenger	City	Motor	Double	49— 0	16.06	4	44	Both	....
Wisconsin											
Milwaukee Electric Railway & Light Co.	40	Passenger	City	Motor	Double	45— 0	17.88	4	54	One	1 CDM
	4	Sweepers	City	Motor	Double	46— 0	36.00	4	....	....	....
Mississippi Valley Public Service Co.	2	Passenger	City	Motor	Single	....	8.50	2	....	One	....
Northern States Power Co.	....	....	....	....	....	....	....	....	....	....	5 CST 1 CDM 2 IDM
Wisconsin Power & Light Co.	....	....	....	....	....	....	....	....	....	....	3 IDM 1 CDF
Wisconsin Valley Electric Co.	2	Passenger	City	Motor	Double	43— 6	17.00	4	52	Both	1 CDM
Total cars Central States	524										
Southern States											
Alabama											
Alabama Power Co.	3	Passenger	City	Motor	Double	42—10	16.25	4	53	One	16 CM
Birmingham Electric Co.	16	Passenger	City	Motor	Double	49— 7	18.00	4	62	Both	13 CDM
	1	Work	City	Motor	Single	16— 4	14.00	2	....	....	....
Mobile Light & Railroad Co.	7	Passenger	City	Motor	Single	29— 9	8.75	2	32	One	2 CDM
Arkansas											
Arkansas Power & Light Co.	30	Passenger	City	Motor	Single	28— 6½	9.00	2	33	One	....
Fort Smith Light & Traction Co.	6	Passenger	City	Motor	Single	28— 0½	8.00	2	32	One	....
Florida											
Key West Electric Co.	....	....	....	....	....	....	....	....	....	....	9 CSM
Miami Beach Ry.	12	Passenger	City	Motor	Double	45— 9	18.00	4	[illegible]	One	....
Municipal Ry. of St. Petersburg	8	Passenger	City	Motor	Double	40— 1	15.22	4	46	Both	1 CDMO
Tampa Electric Co.	10	Passenger	City	Motor	Double	47— 0	....	4	48	Both	....

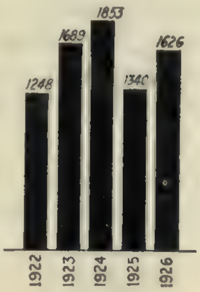
Table VII—Details of Rolling Stock Ordered During 1926—(Concluded)

Name of Company	No.	Class	City or Interurban	Motor or Trailer	Single or Double Truck	Length Over All Ft. In.	Total Wt. Light Tons	No. Motors	Seating Capacity	One or Two Man	No. Cars Junked During Year
Georgia											
Georgia Railway & Power Co.	60	Passenger	City	Motor	Double	46— 4	18.69	4	48	Both	60 CST
	10	Passenger	City	Motor	Double	45— 6	18.12	4	52	Both	34 CDT 3 IDT
Louisiana											
Shreveport Rys.	2	Passenger	City	Motor	Double	45— 8	17.00	4	52	Both	1 CSM
Mississippi											
Mississippi Power Co., Gulfport	....	....	....	....	....	....	....	....	....	....	11 IDM
North Carolina											
Carolina Power & Light Co.	6	Passenger	City	Motor	Single	33— 0	11.00	2	40	One	13 CSM 2 CDM
Tidewater Power Co.	....	....	....	....	....	....	....	....	....	....	
Tennessee											
Memphis Street Ry.	32	Passenger	City	Motor	Double	46— 2	19.00	4	56	Both	....
Nashville Railway & Light Co.	10	Passenger	City	Motor	Double	40— 0	14.50	4	44	Both	....
	1	Work	Construc.	Motor	Double	40— 6	22.50	4	..	......	....
Tennessee Electric Power Co.	10	Passenger	City	Motor	Double	40— 3	13.75	4	44	Both	10 CDM
Total cars Southern States	224										
Western States											
Arizona											
Tucson Rapid Transit Co.	....	....	....	....	....	....	....	....	....	....	2 CDM
California											
Bakersfield & Kern Electric Ry.	....	....	....	....	....	....	....	....	....	....	5 CP
Key System Transit Co.	6	Dump	Construct.	Trailer	Double	42— 0	18.95	......	....	....	10 CDM
	4	Dump	Construct.	Motor	Double	41— 0	27.00	4	....	....	....
Market Street Ry.	29	Passenger	City	Motor	Double	47— 0	19.55	4	50	Two	24 CDM
	2	Passenger	City	Cable	Double	31— 5	6.35	......	36	Two	....
Municipal Ry. of San Francisco	15	Passenger	City	Motor	Double	47— 1	25.00	4	52	Two	....
Pacific Electric Ry.	....	....	....	....	....	....	....	....	....	....	22 IPM 19 IS 51 IF
Colorado											
Colorado Springs & Interurban Ry.	....	....	....	....	....	....	....	....	....	....	3 CSM
Denver Tramway Corp	....	....	....	....	....	....	....	....	....	....	1 CDM
Denver & South Platte Ry.	....	....	....	....	....	....	....	....	....	....	2 CSM
Nebraska											
Lincoln Traction Co.	....	....	....	....	....	....	....	....	....	....	20 CSM 2 CDM
Texas											
Dallas Railway & Terminal Co.	30	Passenger	City	Motor	Double	45— 8¾	19.50	4	52	Both	....
	2	Dump	Construct.	Motor	Double	40— 0	22.68	4	....	....	....
Eastern Texas Electric Co.	4	Passenger	Interurban	Motor	Double	44— 4	....	4	42	Two	5 CDM
El Paso Electric Co	....	....	....	....	....	....	....	....	....	....	8 CSM
Houston Electric Co.	....	....	....	....	....	....	....	....	....	....	3 CDM
San Antonio Public Service Co.	....	....	....	....	....	....	....	....	....	....	1 CM
Utah											
Utah Light & Traction Co.	10	Passenger	City	Motor	Double	40— 1	16.00	4	40	Both	7 CDM
	5	Passenger	City	Trailer	Double	40— 0	7.50	....	56	One	....
Washington											
Puget Sound Power & Light Co.	....	....	....	....	....	....	....	....	....	....	2 IF
Spokane United Rys.	....	....	....	....	....	....	....	....	....	....	36 CDM
Yakima Valley Transportation Co.	1	Service	City	Motor	Single	....	....	....	....	....	....
Total cars Western States	108										
Extraterritorial											
Porto Rico											
Porto Rico Ry., Light & Power Co.	6	Passenger	City	Motor	Double	45— 6	14.00	4	65	Two	....
Total cars Extraterritorial	6										
Dominion of Canada											
British Columbia											
British Columbia Electric Ry	8	Passenger	City	Motor	Double	48— 8	22.45	4	48	Two	3 CDM
	4	Passenger	City	Motor	Double	48— 8	23.15	4	48	Two	2 CSM
	4	Passenger	City	Trailer	Double	48— 8	23.70	....	55	One	1 IDF
Nova Scotia											
Nova Scotia Tramways & Power Co.	4	Passenger	City	Motor	Single	28— 0½	9.25	2	32	One	19 CSM
Ontario											
Hamilton Street Ry.	24	Passenger	City	Motor	Double	40—11	17.00	4	48	Both	16 CSM
Niagara, St. Catharines & Toronto Ry.	12	Passenger	City	Motor	Double	42— 6	16.39	4	44	Two	....
Oshawa Ry.	1	Work	....	....	....	....	....	....	....	....	1 C
Quebec											
Montreal Tramways	50	Passenger	City	Motor	Double	41— 2	17.00	4	40	Both	....
Newfoundland											
Newfoundland Light, Heat & Power Co.	1	Passenger	City	Motor	Single	28— 0½	11.00	2	30	One	....
	3	Sweeper	City	Motor	Single	28— 0	15.00	....	....	....	6 CM
Total cars Canada	111										

C—city cars
CS—city, single truck
CD—city, double truck
CSM—city, single truck, motor
CST—city, single trunk, trailer
CSO—city, single truck, open
CDM—city, double truck, motor
CDT—city, double truck, trailer
CDMO—city, double truck, motor, open
CP—city passenger cars
CM—city motor cars
CDF—city, double truck, flat cars
I—interurban cars
IS—interurban service
ID—interurban, double truck
IDM—interurban double truck, motor
ISM—interurban, single truck, motor
IT—interurban trailer
IP—interurban passenger
IM—interurban motor
IDT—interurban, double truck, trailer
IDF—interurban, double truck, freight
IF—interurban freight
F—freight
PM—passenger motor
S—service cars

teristics agree with those proposed by the A.E.R.A. committee.

The statistics in these tables do not give information of car characteristics such as would show the attention devoted to providing a more pleasing appearance and greater comfort and convenience for passengers. Conclusions can, however, be reached from the large number of descriptive articles which have been published from time to time in ELECTRIC RAILWAY JOURNAL of cars as they were purchased during the year. From these articles it is apparent that car appearance has been given great attention and that the cars now being ordered by the railways and furnished by the manufacturers are of a more attractive design than have ever been produced before.

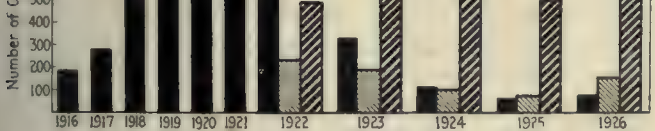


Number of Cars Reported as Junked During Last Five Years

The last column of Table VII is devoted to cars junked during the year. During 1926 a total of 1,626 cars were reported by electric railways as being junked. By grouping these into classes it is found that a total of 1,402 city passenger cars, 135 interurban passenger cars and 89 miscellaneous service, work and freight cars were reported as being junked. It is interesting to note that this shows that the 1,402 city passenger cars junked during 1926 exceeded the 1,249 new passenger cars purchased. This is the first time since this paper has given analyses of the cars junked that this condition has been shown.

An accompanying diagram shows graphically the number of cars junked during the past five years. Comparison of the figures shown in this diagram indicates that the number of cars junked during 1926 was approximately the same as in 1923 and was exceeded only by those junked during the year 1924, when 1,853 cars were reported. The purchase of new cars, however, during 1924 was more than double that for 1926.

The information which has been assembled and is given in the accompanying tables of rolling stock was obtained from replies received to questionnaires addressed to all electric railways in the United States and Canada. Through the courtesy and co-operation of the various car manufacturers, lists of cars built by them during the year were furnished so that the replies received from railways could be checked very carefully. In a few cases where replies have not been received from electric railways themselves, information furnished by the car manufacturers has been used. Replies were received from all car manufacturers. Information from these two sources has been amplified by checking through the files of rolling stock which are kept by ELECTRIC RAILWAY JOURNAL and which include cars purchased and contemplated purchases. Particular care has been used to obtain accurate information from railways which might purchase cars at a late date, so it is felt that this year's information is particularly complete. Details of individual purchases of rolling stock during 1926 follow on pages 25-27.



Graph Showing Relative Purchases of One-Man and One-Man, Two-Man Cars for Eleven Years

Standardization Developments in 1926

NOTABLE developments in the standardization movement, important progress in industrial safety, further extension through managerial and trade association activities and forward steps in international co-operation have been achieved during 1926, according to an announcement of the American Engineering Standards Committee. Standardization was also the subject of a special report at the recent conference of the Premiers of the British Empire.

Instead of leaving standardization work as a more or less incidental function of the engineering and production departments, industrial executives are providing a definite organization for their standardization work. This was well illustrated during "management week," when scores of meetings of industrialists and chambers of commerce, held all over the country, were devoted to the consideration of the standardization and simplification problems which are met by the works manager and his associates.

The systematic organization of company standardization work is leading to a much larger degree of cooperation between companies. For example, in the Cleveland industrial district the men in charge of this work for a large group of important companies have organized for mutual assistance in the work. Through this more than 30 Cleveland firms have reorganized their screw thread practice in accordance with the revised national standard, and more than a dozen firms have systematized their entire control of interchangeable manufacture through the introduction of the new national standard of limit gaging.

In April there were held in New York the most important group of international conferences on standardization ever assembled. Of these, the two principal features were the meeting of the International Electrotechnical Commission with its group of technical committees and the Third Conference of the National Standardizing Bodies, in connection with which there were international technical conferences on screw threads, ball bearings, gages and preferred numbers. In each of these technical conferences real progress was made toward bringing about international uniformity in industrial practice in the different countries. Twenty countries from Europe, Asia and South America were officially represented.

During the conferences a basis was laid for what it is hoped will soon become a unified international standardizing body covering the general field of industrial standardization. In September committees of the two groups met in London, at which time further steps were taken. Final agreement upon a unified plan has not yet been consummated, there naturally being difficulties inherent in a problem involving a group of national as well as international organizations.

Electric Railway Costs and Fares in 1926

While Prices of Wholesale Commodities, Electric Railway Operating Materials and Car Fares Have Been Stabilized at About 150 per Cent of Pre-War Figures, Electric Railway Wages and Construction Costs Are More than Double the 1913 Level

By Albert S. Richey
Electric Railway Engineer, Worcester, Mass.

FOR the past several years, in its Financial and Corporate section, monthly, ELECTRIC RAILWAY JOURNAL has been presenting a series of index numbers compiled by the author under the heading "Conspectus of Indexes." This conspectus comprises indexes showing the trend of street railway fares and the costs of electric railway wages and materials entering into electric railway operation; costs of construction, both electric railway and general; wholesale commodities in general; retail food; cost of living, and some others. In the Annual Statistical Numbers of the JOURNAL—the first issue in January in 1923, 1924, 1925 and 1926—there have been shown charts and tables depicting the trend since 1914 of the more important of these indexes as affecting electric railway operation. In Fig. 4 herewith is shown a similar chart indicating the trend of five of these indexes from January, 1914, through the latest available figures for 1926. The indexes there shown are: (1) Wholesale prices of all commodities, as computed by the U. S. Bureau of Labor Statistics; (2) Electric Railway Construction Costs, as computed by the formula of the American Electric Railway Association; (3) Electric Railway Operating Materials Costs, including fuel for power; (4) Electric Railway Wages; (5) Street Railway Fares.

The methods used in the computation of these five indexes were described fully in the statistical issue of the JOURNAL for Jan. 2, 1926, which issue also contained a tabulation showing the numerical values of the various indexes monthly from January, 1920, through December, 1925. The numerical values monthly from January, 1914, through December, 1919, may be found in the JOURNAL for Jan. 5, 1924. A tabulation herewith shows the numerical value of six of the indexes monthly from January, 1924, to date, and these six indexes are also shown graphically on a somewhat larger scale than Fig. 4 by the charts Figs. 1 to 3 and 5 to 7, inclusive.

As shown by Fig. 1, the average street railway fare has increased slightly during 1926 from 7.32 cents in January to 7.42 cents in December. The change is due principally to increases in the eastern Massachusetts cities and Cleveland, and in a lesser degree to increases in Oakland, Des Moines, Spokane, Louisville, Salt Lake City, Duluth and Norfolk. A number of other increases have been of less consequence in affecting the index, either on account of small amount or the relatively small population involved. During the year only one decrease was noted as affecting the index, this being at Tacoma.

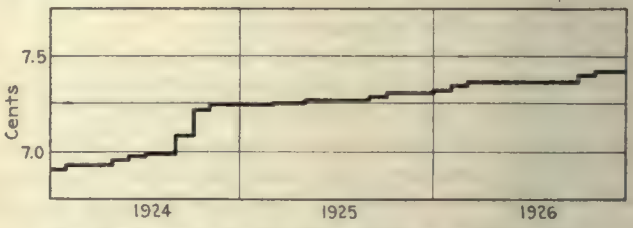


Fig. 1—Street Railway Fares (1923 = 4.8425 Cents

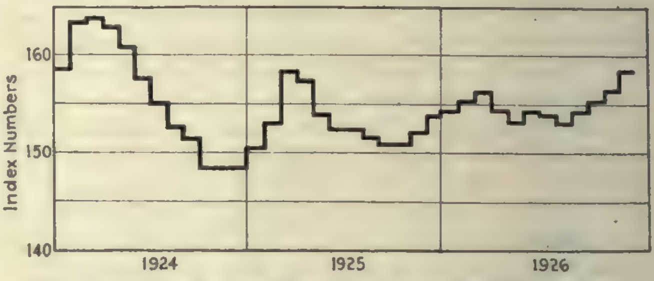


Fig. 2—Electric Railway Operating Materials (1913 = 100)

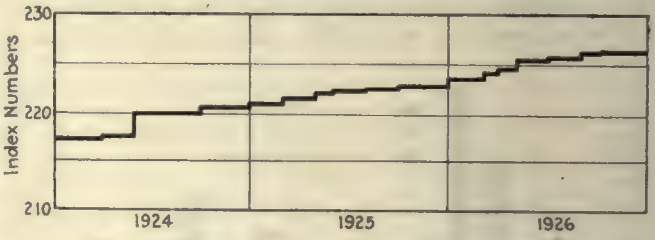


Fig. 3—Electric Railway Wages (1913 = 100)

The trend of the cost of electric railway operating materials has fluctuated only slightly during the year, as shown by Fig. 2, and seems to be stabilizing at about 155 as compared with its pre-war level of 100. The factor which was particularly effective in causing the fluctuations during the year was fuel for power, which enters into this index with the weighting of 40 per cent. Other factors entering maintain prices considerably more uniform than did fuel for power. Nevertheless, as indicated by Fig. 2, the fluctuations in this index were much less marked during 1926 than in either of the two preceding years.

The average wage of electric railway motormen and conductors maintained the upward trend which has been in evidence since the middle of 1923, as shown by Fig. 3. During 1926 eight companies were dropped from this index on account of reduction of forces and one company added, so that the index now

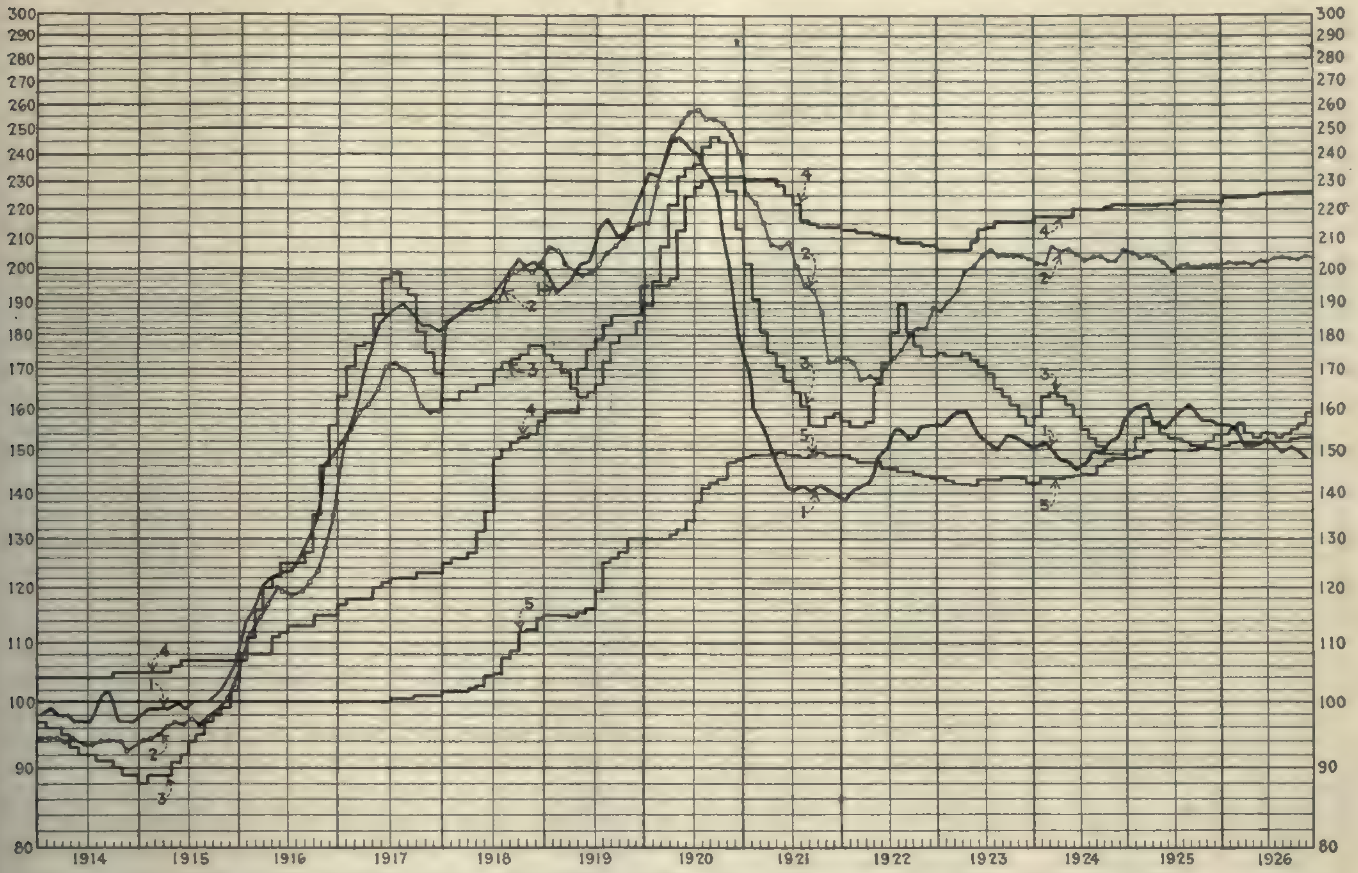


Fig. 4—Trend of Construction Costs, Wages and Fares, 1913-1926 (1913 = 100)

1. Wholesale prices all commodities (U. S. Bureau of Labor Statistics).
2. Electric railway construction costs (American Electric Railway Association statistics).
3. Electric railway operating materials costs (Richey). Includes fuel for power and weighted according to average use in maintenance and operation.
4. Electric railway wages (Richey). Maximum hourly wages of platform men, weighted according to number of men.
5. Street railway fares (Richey). U. S. cities (except New York) weighted according to population.

	Street Railway Fares (Richey)	Elec. Ry. Operating Materials Costs (Richey)	Electric Railway Wages (Richey)	Elec. Ry. Construction Costs (Am. Elec. Ry. Assn.)	General Construction Costs (*Eng.News-Record*)	Wholesale Prices, All Commodities (U.S. Bur. Lab. Stat.)
1913 aver...	100.0	100.0	100.0	100.0	100.0	100.0
1914 aver...	100.0	92.6	104.2	94.0	88.6	98.1
1915 aver...	100.1	93.5	106.2	97.3	92.6	100.8
1916 aver...	100.1	126.2	111.6	119.8	129.6	126.8
1917 aver...	100.5	181.9	120.6	162.7	181.2	177.2
1918 aver...	106.2	168.8	140.5	192.5	189.2	194.3
1919 aver...	120.7	172.2	174.0	205.1	198.4	206.4
1920 aver...	137.2	224.6	217.3	244.7	251.3	226.2
1921 aver...	148.9	169.9	222.7	200.7	201.8	146.9
1922 aver...	146.0	170.0	210.0	175.2	174.4	148.8
1923 aver...	142.9	168.0	212.1	200.2	214.1	153.7
1924						
January....	142.6	158.5	217.4	203.0	217.9	151.2
February...	143.1	163.2	217.4	203.8	220.3	151.7
March.....	143.1	163.9	217.5	206.8	224.7	149.9
April.......	143.2	162.8	217.7	205.5	221.6	148.4
May.......	143.5	160.8	217.8	206.7	222.4	146.9
June.......	143.8	157.6	220.0	204.8	216.8	144.6
July.......	144.2	154.9	220.0	203.7	214.4	147.0
August.....	144.3	152.6	220.0	204.3	213.1	149.7
September..	146.2	151.4	220.1	204.3	211.2	148.8
October....	149.1	148.5	220.6	203.2	207.5	151.9
November..	149.5	148.6	220.7	203.7	205.7	152.7
December..	149.6	148.7	220.8	205.6	208.6	157.0

1925	Street Railway Fares (Richey)	Elec. Ry. Operating Materials Costs (Richey)	Electric Railway Wages (Richey)	Elec. Ry. Construction Costs (Am. Elec. Ry. Assn.)	General Construction Costs (*Eng. News-Record*)	Wholesale Prices, All Commodities (U.S. Bur. Lab. Stat.)
January....	149.6	150.3	221.0	205.3	210.4	160.0
February...	149.6	153.1	221.0	203.9	209.7	160.6
March.....	149.9	158.4	221.5	204.4	210.2	161.0
April.......	150.0	157.3	221.6	204.1	209.5	156.2
May.......	150.0	153.9	222.2	202.0	207.2	155.2
June.......	150.0	152.4	222.4	200.0	204.6	157.4
July.......	150.2	152.6	222.5	200.1	204.6	159.9
August.....	150.3	151.6	222.6	201.0	204.6	160.4
September..	150.6	150.9	222.7	200.5	202.1	159.7
October....	151.0	150.9	222.8	202.7	205.3	157.6
November..	150.7	152.0	222.8	202.4	205.9	157.7
December..	150.7	153.9	223.0	202.2	205.9	156.2
1926						
January....	151.2	154.3	223.8	202.2	207.1	156.0
February...	151.8	155.3	223.8	201.9	206.5	155.0
March.....	151.9	156.4	224.1	202.0	207.6	151.5
April.......	151.9	154.2	224.7	201.3	207.0	151.1
May.......	151.9	153.1	225.4	202.4	207.3	151.7
June.......	152.1	154.4	225.5	201.9	204.8	152.3
July.......	152.0	154.1	225.7	203.2	207.8	150.7
August.....	152.0	153.1	225.9	203.6	208.3	149.2
September..	152.0	154.2	226.1	203.2	208.3	150.5
October....	152.8	155.4	226.2	202.9	209.8	149.7
November..	153.2	156.6	226.3	203.7	210.8	148.1
December..	153.2	159.2	226.3	203.2	210.8	.....

includes 137 companies, each of which employs more than 100 motormen and conductors, and indicates the trend of the average wage of 105,025 men. The upward trend of the index during 1926 was due principally to increased wages in San Francisco, Philadelphia, Louisville, Cleveland, Connecticut, Detroit, Memphis, Cincinnati, Birmingham, Providence and eastern Massachusetts. Several other increases were noted which affected the index only slightly, either on account of the limited amount of the increase or the relatively small number of men involved. The average wage of the 105,025 men, as compared with 1913, had increased 123.8 per cent up to January, 1926, and 126.3 per cent up to December, 1926, there being an increase of 1.1 per cent during the year 1926. It will be noted that, in comparison with the rise in cost of living, the increase in electric railway wages has been out of all proportion. According to the National Industrial Conference Board, the cost of living since 1914 had increased 70.4 per cent up to January, 1926, and 67.2 per cent up to November, 1926. The average index of the cost of living during 1926 was about 168, and the average index of electric railway wages was about 225. This indicates a very considerable increase in the "real wages" of motormen and conductors, the index representing "real wages" being the index of wages divided by the index of cost of living, or 134. In other words, the average motorman or conductor in the United States has had the opportunity to increase his standard of living since 1914 by about 34 per cent.

CONSTRUCTION COSTS AND WHOLESALE PRICES

Turning to construction costs, the American Electric Railway Association Construction Cost Index, as shown by Fig. 5, has maintained a very constant level during the year, with minor fluctuations between 201.3 and 203.7, as compared with the pre-war level of 100 in 1913. The minor rise occurring about the middle of the year was principally due to the increased wage of common labor, which according to the *Engineering News-Record* averaged 54 cents for the country as a whole in January and had increased to 55½ cents in August, which latter figure was being maintained in December. It will be noted that the index, which averages about 202 for 1926, is somewhat lower than two years ago, when it was about 205, that being the maximum since the post-war low in 1922. Apparently this index is stabilizing at somewhere between 200 and 205 per cent of the pre-war value.

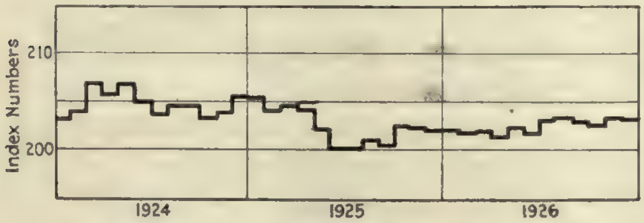


Fig. 5—A.E.R.A. Electric Railway Construction Cost Index (1913 = 100)

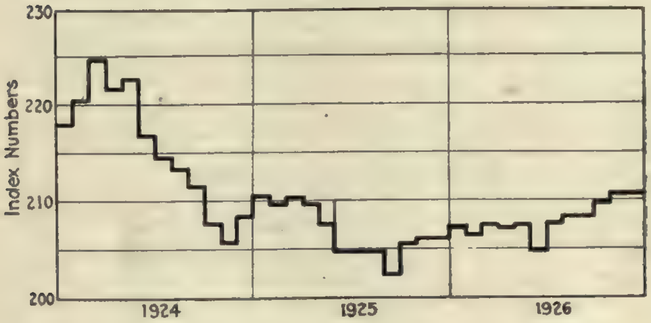


Fig. 6—"Engineering News-Record" Construction Cost Index (1913 = 100)

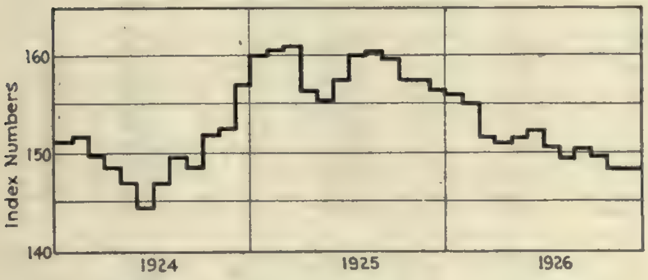


Fig. 7—Index of U. S. Bureau of Labor Statistics Wholesale Commodities (1913 = 100)

The *Engineering News-Record* Construction Cost Index (Fig. 6) applies to construction cost in general, and is here presented as of some value for comparison with the Electric Railway Construction Cost Index. The Electric Railway Index includes a much heavier weighting of labor than the general index, and is further stabilized by the heavier weighting of steel rail, the price of which has remained constant at $43 per ton since October, 1922. The General Construction Cost Index as compared with the Electric Railway Index during 1926 shows a slightly greater tendency upward during the last half of the year, although its reduction as compared with 1924 is considerably greater. The General Construction Cost Index is apparently stabilizing itself at about five points higher than the Electric Railway Construction Cost Index, both on the basis of 1913.

The Wholesale Commodity Index of the U. S. Bureau of Labor Statistics (Fig. 7) is perhaps the most often quoted of any index which purports to show the trend of the general price level. This index reached a maximum of 246.7 in May, 1920, dropped sharply to about 140 in 1921, rose to 158 in 1923, dropped to an average of 150 in 1924, averaged about 157 in 1925, and during the last half of 1923 has been hovering around 150. In other words, for the past several years, while this index has averaged about 150, it has been subject to fluctuations which carried it about ten points above and below that average in cycles of about two years. It is, of course, impossible to foretell its future course, but if the experience of the last four years is of any value, it confirms the opinion previously expressed, that the general price level is tending to fix itself at about 50 per cent above the pre-war level. Electric railway operating materials costs as compared with pre-war levels have increased only about the same amount, or 50 per cent. Construction costs have increased more than 100 per cent and electric railway wages more than 125 per cent. Inasmuch as neither the general commodity index nor the operating materials index contains a labor item, it is fair deduction that the disproportionate rise in electric railway construction and operating costs is due in large measure to the disproportionate increase in wages as compared with that of commodities in general. The fact remains that both construction and operating costs of electric railways have increased very considerably more than the cost of commodities in general, and, further, that the increase in the average fare paid for street railway service in the country as a whole has increased only about the same as commodities in general. The necessity for such operating economies as the light-weight car and one-man operation is evident, when the indexes of street railway fares and wages are compared.

Statistics on Cars and Mileage

IN PREVIOUS statistical issues of this paper, or in issues shortly after the first of the year, it has been customary to include a table showing the number of electric railways in the United States and the miles of track, and number of cars of various kinds owned by these companies. This table has been compiled each year from the issue of the McGraw Electric Railway Directory published shortly after the first of each year.

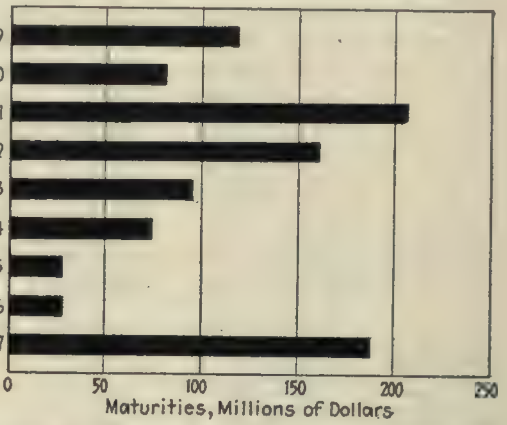
Owing to changes in the publication date of this directory, the collection of statistics for it has not progressed sufficiently to permit the publication of a similar table at this time. It is expected, however, that such a table, as of Jan. 1, 1927, will appear in pages of ELECTRIC RAILWAY JOURNAL before long.

Total of New Securities Publicly Offered Was Small

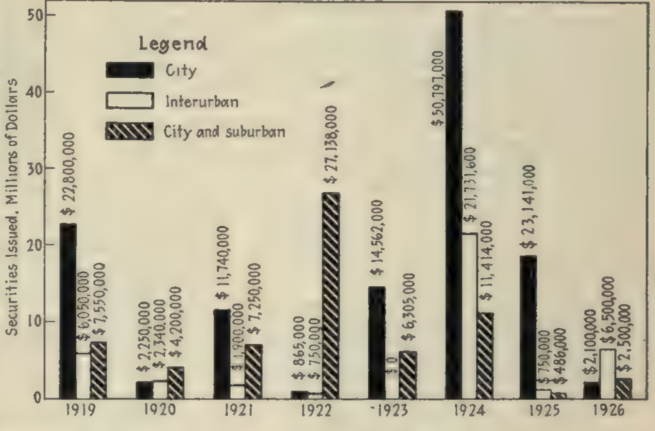
RECORDS of financing for 1926 of companies doing purely a railway business make it appear that the issues in amount of more than $500,000 placed publicly totaled $11,100,000. This is less than half the total so placed during the previous year. But compared with the average it shows up favorably. The amount is determined largely by the volume of maturities from year to year. It takes no account of such issues as were placed privately by the investment bankers, and does not take into account equipment trust issues sold similarly, of which, of course, there is no public record. It would be idle to speculate about the bulk of this business. As regards the financing of new buses purchased, the amount probably is sizable, but no records are available about it, for the paper is placed privately.

There is no blinking the fact that the companies doing a purely railway business have been living out of earnings, not capital. They have been husbanding their resources, but the financing done publicly, small though it may bulk in the aggregate, has been done on moderate terms. The records bear this out. With the improvement being shown in the earnings situation generally and the tendency of money rates to ease off, it would seem likely that when the railways do appear again publicly to finance their requirements they will be able to do so on terms fairly favorable to themselves. The Gary financing, in particular, seems to be a case in point. This little road, thoroughly rehabilitated, has re-established its earning power, and Halsey, Stuart & Company, who did the financing of the railway's equipment trust obligations, did not hesitate unequivocally to recommend the securities at prices that were not inordinate, namely, 5.50 to 6 per cent. Similarly Blyth, Witter & Company offered the first mortgage obligations of the city and suburban property of the Key System Transit Company at a price to yield 5.78 per cent. The Philadelphia Rapid Transit Company equipment trust issue speaks for itself. So does the Chicago, North Shore & Milwaukee issue. The Chicago, Aurora & Elgin Railroad issue was somewhat different. Here is a road recently rehabilitated earning its interest a little more than twice over, still the issuing price was reasonable, based undoubtedly on the prospective probable future earning capacity of the company. So much for the financing that has been done.

As for the future, the industry is faced with maturities of $180,798,000 in 1927 compared with only $26,644,790 in 1926. The great bulk of this, however, is made up of issues of the surface line companies at Chicago. This amount is close to $145,000,000, but the earning capacity of the roads is well established. It is only the political situation with franchises about to expire that causes any concern with respect to the matter there. It is, of course, impossible to hazard a guess at this time regarding probable impending events in Chicago, but the course things are taking indicates that the full measure of protection will be available to the holders of these securities.



Maturities in 1927 Are Larger than for Any Recent Year Except 1921



Securities Issued for Electric Railway Properties Were Smaller than for Several Years

It takes time to amend the consequences of events such as the electric railways experienced in the wartime and post-war periods, but the results are beginning to manifest themselves. Let it be recalled, incidentally, that the steam railroads suffered no less acutely than did the electric railways during this period, and they are only just now beginning to re-establish themselves financially. It might be said by some that there is small comfort in this, but that is not altogether so. True, $126,556,400 of traction securities still are in default, but some of them date back—in the unusual case of the Second Avenue Railroad, New York—to 1908. The amount of such defaults has been constantly diminishing in the last few years, and the prospects are that many other issues of the kind will be eliminated from the list now that the earning power of many of the properties is being re-established. It might at first appear that succor has long been delayed to the investor in some of these cases, but the length of time is not the real criterion. Rather is it the enduring accomplishment that has been achieved in the interim. It is not so easy always to accept this view, but it is the correct one just the same. After all, the basis of any security is the earning power of the property on which it is a lien. This is true even of bonds secured on real estate, the supposed premier investment.

Details of New Bond and Note Financing in Amounts of More than $500,000 Offered Publicly in 1926

Issue	Price	Maturity	Yield	Amount
January				
Gary Railways equipment trust certificates, Series A 5½	1.00 to 97.89	1930	5.50 to 6	$350,000
Chicago, Aurora & Elgin Railroad first and refunding 6's	96	1951	5.30	5,000,000
February				
Philadelphia Rapid Transit equipment trust 5's, Series J	....	1929	4.75 to 5.35	1,750,000
Key System Transit Company first mortgage 5½	97½	1938	5.78	2,500,000
September				
Chicago, North Shore & Milwaukee Railroad first and refunding mortgage 5½	98.50	1956	5.60	1,500,000
Total				$11,100,000

Eight-Year Record of New Electric Railway Financing Involving Bond or Note Issues of More than $500,000

	City Railway	Interurban	City and Suburban
1919	$22,800,000	$6,050,000	$7,550,000
1920	2,250,000	2,340,000	4,200,000
1921	11,740,000	1,900,000	7,250,000
1922	865,000	750,000	27,138,000
1923	14,562,000	....	6,305,000
1924	50,797,000	21,731,600	11,414,000
1925	23,141,000	750,000	486,000
1926	2,100,000	6,500,000	2,500,000

Principal Electric Railway Maturities in 1927 Based on Dow, Jones & Company's Compilation

January	Rate	Amount
Chicago City & Connecting Railways clt.	5	$20,616,000
Winnipeg Electric Street Railway 1st	5	579,000
Interborough Rapid Transit equipment trust B	6½	450,000
Springfield & Eastern Street Railway 1st	7	330,000
Eastern Massachusetts Street Railway serial	6	300,000
New Bedford & Onset Street Railway 1st	6	280,0000
Peoples Railway 1st	5	200,000
Wayne & Fifth Street Railroad 1st	5	200,000
Brooklyn City Railroad equipment trust	5	375,000
		$23,330,000
February		
Chicago Railways 1st	5	$55,655,000
Chicago City Railway 1st	5	33,926,000
Chicago Railways Consolidated B	5	17,164,470
Chicago Railways Consolidated A	5	16,703,800
Calumet & South Chicago 1st	5	5,458,000
Chicago Railways purchase money	5	3,969,300
West End Street Railway debenture	6½	2,700,000
Chicago Railways income	4	2,500,000
Philadelphia Rapid Transit equipment trust G	5½	237,500
Hagerstown & Northern Railroad 1st	5	200,000
Pittsburgh Railways car trust	6	200,000
		$138,714,040
March		
Interborough Rapid Transit equipment trust A	6	$280,000
		$280,000
April		
Denver City Tramway extended	6	$2,000,000
Detroit, Ft. Wayne & Belle Isle 1st	5	857,000
Denver Tramway Power extended	6	693,000
Des Moines City Railway 5-year	7	618,000
Enid City Railway 1st	5	235,000
		$4,403,000
May		
West End Street Railway 5-year	6	$1,956,000
Jacksonville Electric (now traction) 1st	5	1,245,000
New Castile Traction 1st	5	470,000
		$3,271,000
June		
Galveston-Houston Electric 2-year	7	$1,200,000
Berkshire Street Railway extended	7	777,000
Buffalo, Bellevue & Lancaster 1st	5	215,000
		$2,192,000
July		
Lorain & Cleveland Railway 1st	5	$750,000
		$750,000
August		
United Railways & Electric Company of Baltimore 5-year	6	$2,500,000
Phila. Rapid Transit equipment trust G	5½	237,500
New Albany (Ind.) Street Railroad 1st	5	234,000
		$2,971,500
September		
Worcester & South Bridge Street Railway	7	$500,000
		$500,000
October		
South Bend & Southern Michigan Railway 1st	5	$750,000
Pittsburgh Traction 1st	5	684,000
Citizens Traction, Pittsburgh 1st	5	657,000
		$2,091,000
November		
Worcester Consolidated Street Railway debenture	5	$1,200,000
Interborough Rapid Transit equipment trust C	6	570,000
		$1,770,000
December		
Phila. Rapid Transit equipment trust H	5½	$270,000
Scranton Railway guaranteed notes	6	458,690
Altoona & Logan Valley Railway guaranteed	6	247,560
		$975,560
Total 1927		$180,798,000
Total 1926		26,644,790

Comparison of Maturities in the Electric Railway Field

1927	$180,798,000	1922	$160,015,860
1926	26,644,790	1921	207,617,530
1925	28,224,000	1920	80,466,100
1924	73,051,600	1919	116,785,500
1923	94,851,800		

Below are given electric railway bonds in default of interest as of Dec. 31, 1926, with amount and date of default, based on Dow, Jones & Company's compilation for the entire utility industry. Where the maturity date appears after the issue, it means there is default as to principal as well as to interest. Technical defaults are not included in this table:

Electric Railway Bonds in Default as of Dec. 31, 1926

Public Utility Issues:	Amount	Defaulted
Auburn & Syracuse Electric 5s	$1,752,000	Apr. 1926
Binghamton Railway cons. 5s	1,833,000	May 1926
General and refunding 6s	426,200	July 1925
Binghamton Railroad 6s, 1925	452,000	July 1925
Bing, Lester & Union Ry. 5s, 1925	147,000	June 1925
Boise Valley Traction 5s, 1925	750,000	Jan. 1923
Boise & Interurban Ry 1st 5s	964,000	Apr. 1925
Buffalo & Lackawanna Traction 5s	1,150,000	Dec. 1918
Chatham, Wallaceb. & L. E. 5s, 1925	694,500	July 1925
Chicago & Interurban Traction 5s	1,816,000	Jan. 1922
Cin., Lawrence & A. St. Ry. 5s, 1919	750,000	Jan. 1918
Columbia & Montour El. Ry. 5s	375,000	July 1914
Columb., Lond. & Springfield 5s, 1920	1,260,000	Oct. 1920
Dayton, Cov. & Piqua Trac. 5s, 1922	490,000	Apr. 1922
Detroit, Altmont & Northern 6s	400,000	Aug. 1925
Detroit, Jackson & Chicago Ry. 5s	881,000	July 1925
Detroit, Monroe & Toledo Sh. L. 5s	3,000,000	July 1925
Detroit & Port Huron Sh. L. 5s	2,497,000	July 1925
Detroit United coll. tr. 6s	8,472,000	July 1925
Two-year coll. tr. notes 6s, 1926	640,000	Aug. 1925
Det, Ypsilan, Ann Arb. & Jack. 5s	1,610,000	Aug. 1925
Geneva, Seneca Fall & Aub. R. R. 5s	497,000	Jan. 1926
Gd. Rapids, Gd. Haven & M. 5s, 1926	1,500,000	Jan. 1926
Gd. Rapids, Holland & L. M. 5s, 1924	1,500,000	Aug. 1924
Indiana, Col. & Eastern Trac. 5s	6,400,000	Nov. 1919
Indiana Northern Traction 5s	500,000	Apr. 1925
Indiana Union Trac. 1st 5s	1,620,000	Apr. 1925
Indianapolis & Cincinnati Traction 5s	1,400,000	July 1923
Indianapolis, Newcastle & East., 6s	1,200,000	June 1925
Indianapolis Northern Traction 5s	5,000,000	Jan. 1925
Indianapolis, Shelby & S. E. Traction 5s	414,000	July 1923
Indianapolis & Southeastern Traction 5s	586,000	July 1923
Jackson Consol. Traction 5s	790,000	May 1925
Jefferson Traction 6s, 1925	434,000	Jan. 1925
Kansas City, Lawr. & Top. R.R. 5s	400,000	Sept. 1919
Kansas-Oaklahoma Traction 6s	250,000	Nov. 1924
Lakeside Railway 1st 6s	150,000	May 1926
Lima, Findlay & Ohio Ry. 5s, 1925	324,000	Jan. 1925
Lowell & Fitchburg St. Ry. 5s, 1926	275,000	Jan. 1926
Michigan Electric Ry. ref. 5s	7,190,500	Jan. 1925
Michigan Railroad 1st 6s	4,050,000	May 1924
Milford, Hollis & Framingham 7s	165,000	July 1925
Milford & Uxbridge St. Ry. 7s	335,000	July 1925
Millvale, Etna & Sharp 5s, 1923	741,000	Nov. 1923
Minn., Anoka & Cuyuna Range 5s	380,000	Nov. 1925
Morris County Traction 1st 5s	3,000,000	June 1922
Muncie, Hartford & Ft. Wayne 5s	916,000	Jan. 1925
Muncie & Union City Traction 5s	925,000	Jan. 1925
New York & Queens County Ry. cons 4s	1,300,000	Apr. 1922
Northern Cambria Ry. 1st 5s	250,000	Nov. 1924
Olean, Brad. & Salamanca Ry. 7s	264,000	Sept. 1926
Penn Street Ry. 1st 5s, 1922	250,000	June 1922
Pitts, Crafton & Mansfield 5s, 1924	171,000	July 1924
Pitts. & W. End Pass. Ry. 5s, 1922	313,000	July 1922
Rockford, Beloit & Janesville 5s	907,000	Apr. 1925
Rockford & Freeport Elec. Ry. 5s	490,000	Nov. 1925
Rockford & Interurban Ry. 5s	1,685,500	Oct. 1925
St. Louis & Suburban gen. 5s, 1923	4,500,000	Apr. 1923
Consolidated 8s, 1923	2,000,000	Oct. 1923
St. Louis Transit 5s, 1924	9,790,000	Apr. 1924
Salt Lake & Utah 1st 5s	1,431,900	Oct. 1925
Convertible notes 7s	150,000	Oct. 1925
Schuykill Railway 1st 5s	640,000	Apr. 1926
Schuykill Traction 1st 5s	500,000	Apr. 1926
Consolidated 4½s	105,000	July 1926
Second Avenue R.R. cons. 5s	5,631,000	Aug. 1908
Receivers' certificates 6s, 1924	3,140,000	Oct. 1914
Steinway Railway 6s, 1922	1,500,000	July 1922
Trenton, Bristol & Phila 5s	413,800	Mar. 1925
Union Traction of Indiana 6s	4,623,000	Jan. 1925
Union Traction Coffeyville 5s	900,000	Jan. 1925
Wash., Alex. & Mt. Vernon Ry. 5s	2,500,000	Sept. 1920
Wash., Arling. & Falls Church 5s	650,000	Sept. 1920
Second 5s	250,000	Apr. 1921
Wash., Virginia Ry. notes A 6s, 1922	759,500	Jan. 1922
B notes 6s, 1922	666,500	Jan. 1922
Waterloo, Cedar Falls & Nor. 5s	5,773,000	Jan. 1922
Western Ohio Ry. 1st 5s, 1921	2,500,000	Nov. 1921
Youngstown & Ohio River 1st 5s	1,200,000	Oct. 1926
Total in default	$126,556,400	

Bus Development Continued Steadily

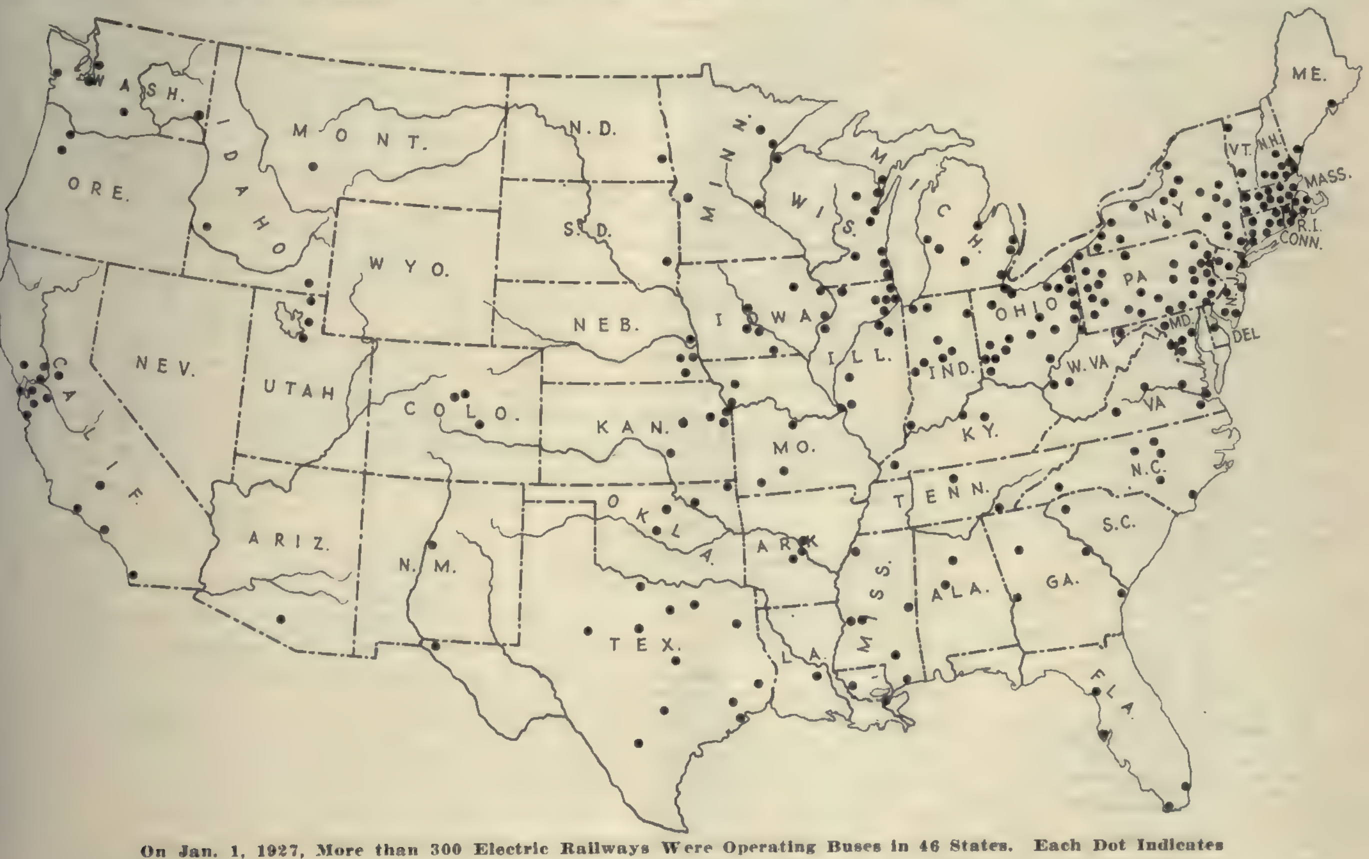
Number of Electric Railways Engaged in Bus Operation Increased Approximately 20 Per Cent During 1926, While the Number of Buses Increased More than 40 Per Cent—Much New Route Mileage Added—Replacement of Rail Service Comparatively Slight—Large Purchases Made of Other Automotive Equipment

EXPANSION of bus operations by electric railways in the United States and Canada continued steadily during the year just ended. According to reports received by ELECTRIC RAILWAY JOURNAL from properties representing over 95 per cent of the industry, 280 electric railways were operating a total of 5,358 buses on Jan. 1, 1926. A survey just completed shows that on Jan. 1, 1927, some 333 such companies are operating 7,749 buses. Thus during the year there has been an increase of approximately 20 per cent in the number of operating companies and more than 40 per cent in the number of buses. A list of electric railways now engaged in bus operation is given in Table I, together with the number of buses owned and the names of subsidiary companies.

First place in the number of buses operated is still held by Public Service Railway with 1,204. Philadelphia Rapid Transit Company is again second with 382. Next in point of numbers come the Department of Street Railways, City of Detroit, with 303 buses. In the list there are altogether fifteen companies having more than 100 buses each. In addition to the companies named, these are the Boston Elevated Railway, Connecticut Company, Virginia Electric & Power Company, Illinois Power & Light Corporation, South Shore Motor Coach Company, Detroit United Railway, Twin City Rapid Transit Company, Cleveland Railway, Northern Ohio Power & Light Company, Pennsylvania-Ohio System, the Milwaukee Electric Railway & Light Company, the Los Angeles Railway and the Pacific Electric Railway.

In contrast to the large number of electric railways which have been added to the list of bus operators during the year just ended, only four of those formerly engaged in bus operation have now abandoned it. These are the Stockton Electric Railroad in California, the Stark Electric Railroad in Ohio, the Reading Transit Company in Pennsylvania, and the Nova Scotia Tramways & Power Company. Fifteen others have given up portions of their bus route mileage while continuing the operation elsewhere. Altogether about 200 miles of bus route has been abandoned during the year.

Subsidiary companies are utilized by about one-third the electric railways engaged in bus operation. Joint subsidiaries for two or more electric railways are gaining in popularity. Outstanding examples include the Los Angeles Motor Bus Company, a joint subsidiary of the Los Angeles Railway and the Pacific Electric Railway; the Shore Line Motor Coach Company, a joint subsidiary of the Chicago, South Shore & South Bend



On Jan. 1, 1927, More than 300 Electric Railways Were Operating Buses in 46 States. Each Dot Indicates a Bus-Operating Electric Railway Company

Table I—Bus Operation by Electric Railways and Subsidiary Companies

	Buses Owned
Connecticut	
Connecticut Co.	113
Danbury Power & Transportation Co.	16
Groton & Stonington Traction Co.	3
*Hartford & Springfield Street Ry.	21
*Lordship Ry.	6
New Haven & Shore Line Ry.	13
Waterbury & Mildale Tramway	3
Maine	
Central Maine Power Co.	(b) 1
York Utilities Co.	8
Massachusetts	
Boston Elevated Ry.	227
Boston & Worcester Street Ry.	19
Eastern Massachusetts Street Ry.	65
Fitchburg & Leominster Street Ry.	5
Gardner-Templeton Street Ry.	4
Holyoke Street Ry	3
Interstate Street Ry.	(a) 8
Middlesex & Boston Street Ry	45
New Bedford & Onset Street Ry.	5
Plymouth & Brockton Street Ry.	3
Springfield Street Ry.	27
Union Street Ry.	12
Worcester Consolidated Street Ry.	17
New Hampshire	
Dover, Somersworth & Rochester Street Ry.	6
*Exeter, Hampton & Amesbury Street Ry.	6
*Keene Electric Ry.	8
*Laconia Street Ry.	5
*Manchester & Derry Street Ry.	3
Nashua Street Ry.	3
*Portsmouth Electric Ry.	12
Rhode Island	
*Newport Electric Corp.	21
Newport & Providence Ry.	10
United Electric Rys.	70
Vermont	
Burlington Traction Co.	1
*Twin State Gas & Electric Co.	1
Delaware	
Wilmington & Philadelphia Traction Co.	45
Delaware Bus Co.	
Southern Pennsylvania Bus Co.	
District of Columbia	
Capital Traction Co.	27
Washington & Old Dominion Ry.	1
Washington Railway & Electric Co.	57
Washington-Virginia Ry.	5
Alexandria & Suburban Motor Vehicle Co.	
Maryland	
Cumberland & Westernport Electric Ry.	4
Cumberland & Westernport Transit Co.	
Hagerstown & Frederick Ry.	47
Blue Ridge Transportation Co.	
United Rys. & Electric Co.	82
Baltimore Transit Co.	
East Fayette Street Bus Co.	
New Jersey	
Coast Cities Ry.	23
Atlantic Coast Transportation Co.	
Cumberland Traction Co.	15
Cumberland Transit Co.	
Morris County Traction Co.	9
*New Jersey Inter-Urban Co.	6
New Jersey Interurban Coach Co.	
Ocean City Electric R.R.	1
Public Service Ry.	1204
Public Service Transportation Co.	
Penn-Jersey Transit Co. (c)	
Trenton & Mercer County Traction Corp.	29
Central Transportation Co.	
New York	
Auburn & Syracuse Electric R.R.	8
Mid-State Coach Lines (c).	
Binghamton Ry.	11
Black River Traction Co.	15
Watertown Transportation Co.	
Brooklyn-Manhattan Transit Corp.	(b) 10
Buffalo & Erie Ry.	(a) 1
Buffalo & Erie Coach Corp.	
Cortland County Traction Co.	3
Cortland County Bus Lines	
Empire State R.R.	6
Mid-State Coach Lines (c).	
Fonda, Johnson & Gloversville R.R.	1
Sacandaga Valley Transportation Co.	
Geneva, Seneca Falls & Auburn R.R.	3
International Ry.	67
International Bus Corp.	
Jamestown Street Ry.	10
Jamestown Motor Bus Transportation Co., Inc.	
Kingston Consolidated R.R.	5
Kingston City Transportation Corp.	
*Newburgh Public Service Co.	22
New York Rys.	(b) 1
New York State Rys. (Rochester)	64
Darling Bus Line, Inc.	
East Avenue Bus Co., Inc.	
Rochester Interurban Bus Co., Inc.	
Rochester Rys. Co-ordinated Bus Lines, Inc.	
New York State Rys (Syracuse)	17
Syracuse Railway Co-ordinated Bus Line, Inc.	
New York State Rys. (Utica)	9
Utica Railway Co-ordinated Bus Line, Inc.	
Niagara Gorge R.R.	4
Niagara Gray Bus Lines	
Olean, Bradford & Salamanca Ry.	5
Olean, Bradford & Salamanca Bus Line, Inc.	
*Peekskill Lighting & R.R. Co.	9
Peekskill Motor Bus Corp.	
*Port Jervis Transit Co.	2
Rochester & Syracuse R.R.	1
Mid-State Coach Lines, (c).	
Syracuse & Eastern R.R.	3
Third Avenue Ry.	20
Eastchester Transportation Corp.	
North Street Transportation Corp.	
Westchester Street Transportation Co.	
United Traction Co. of Albany	49
Capital District Transportation Co.	
*Walkill Transit Co.	8
Pennsylvania	
Altoona & Logan Valley Electric Ry.	20
Logan Valley Bus Co.	
Bangor & Nazareth Transit Co.	3
Bangor & Portland Transit Co.	2
Paul R. La Bar.	
Beaver Valley Traction Co.	16
Beaver Valley Motor Coach Co.	
Chambersburg & Shippensburg Ry.	3
Cumberland Valley Transit Co.	
Citizens Traction Co.	13
Citizens Transit Co.	
Conestoga Traction Co.	4
Conestoga Transportation Co.	
Duquesne & Dravosburg Street Ry.	2
Erie Rys.	6
Erie Coach Co.	
Johnstown Traction Co.	11
Traction Bus Co.	
Lackawanna & Wyoming Valley R.R.	5
Laurel Line Bus Co.	
Lehigh Traction Co.	10
Hazleton Auto Bus Co.	
Lehigh Valley Transit Co.	16
Lehigh Valley Transportation Co.	
Lewiston & Reedsville Electric Ry.	3
Lewiston & Reedsville Transportation Co.	
Northumberland County Ry.	3
Sunbury Transit Co.	
Northwestern Electric Service Co.	5
Penn Public Motor Transportation Co.	
Philadelphia Rapid Transit Co.	382
Philadelphia Rural Transit Co.	
Penn-Jersey Transit Co. (C)	
Philadelphia & Westchester Traction Co.	19
Aronimink Transportation Co.	
Philadelphia & Western Ry.	2
Main Line Transfer Co.	
Pittsburgh, Harmony, Butler & New Castle Ry.	
Pittsburgh, Mars & Butler Ry.	8
Harmony Short Line Motor Transp. Co.	
Pittsburgh Rys.	34
Pittsburgh Motor Coach Co.	
Schuylkill Ry.	11
Schuylkill Transportation Co.	
Scranton Ry.	11
Scranton Bus Co.	
Shamokin & Edgewood Electric Ry.	5
Shamokin & Trevorton Bus Line.	
Southern Cambria Ry.	4
Southern Cambria Bus Co.	
Stroudsburg Traction Co.	3
East Stroudsburg Bus Co.	
*United Traction Street Ry.	2
Du Bois Transit Co.	
West Chester Street Ry.	65
Peoples Transportation Corp.	
Westmoreland County Ry.	5
Chestnut Ridge Transportation Co.	
West Penn Rys.	2
Penn Bus Lines.	
Westside Electric Street Ry.	3
Westside Motor Transit Co.	
Wilkes-Barre Ry.	21
Williamsport Passenger Ry.	2
Williamsport Transportation Co.	
York Rys.	4
York Transit Co.	
Virginia	
Lynchburg Traction & Light Co.	2
Newport News & Hampton Ry., Gas & Elec. Co.	4
Norfolk Southern R.R.	3
Roanoke Railway & Electric Co.	5
Virginia Electric & Power Co.	235
West Virginia	
Charleston Interurban R.R.	33
Monongahela-West Penn Public Service Co.	13
Ohio Valley Electric Ry.	23
Ohio Valley Bus Co.	
Wheeling Public Service Co.	4
Wheeling Traction Co.	
Ohio Valley Transit Co.	11
Illinois	
Aurora, Elgin & Fox River Electric Co.	5
Central Illinois Public Service Co.	5
Chicago, Aurora & Elgin R.R.	2
Chicago & Joliet Electric Ry.	9
Chicago & Joliet Transportation Co.	
Chicago, North Shore & Milwaukee R.R.	47
Chicago & West Towns Ry.	22
East St. Louis & Suburban Ry.	35
Blue Goose Motor Coach Co.	
Red Line Motor Bus Co.	
Evanston Ry.	12
Evanston Bus Co.	
Illinois Power Co.	12
Illinois Power & Light Corp.	
(Bloomington)	7
(Champaign)	12
(Danville)	4
(Decatur)	19
(Galesburg)	8
(Jacksonville)	3
(Peoria)	16
(Quincy)	10
Illinois Traction System.	
(Main Line Division)	8
(Valley Division)	7
*Joliet, Plainfield & Aurora Transportation Co.	5
Rockford City Traction Co.	9 (a) 18
Rockford & Interurban Ry.	6
Indiana	
Chicago, South Bend & Northern Indiana Ry.	24
Railway Transit Lines.	
Chicago, South Shore & South Bend R.R.	123
Gary Railways.	
Shore Line Motor Coach Co.	
Evansville & Ohio Valley Ry.	2
Indianapolis & Cincinnati Traction Co.	4
Indianapolis Street Ry.	33
Indiana Service Corp.	25
Interstate Public Service Co.	43
Northern Indiana Power Co.	2
Southern Indiana Gas & Electric Co.	10
Terre Haute, Indianapolis & Eastern Traction Co.	40
Indiana Motor Transit Co.	
Union Traction Co.	38
Iowa	
Des Moines City Ry.	6
Des Moines & Central Iowa R.R.	3
Des Moines Electric Light Co.	6
Dubuque Electric Co.	7
Fort Dodge, Des Moines & Southern R.R.	16
Fort Dodge, Des Moines & Southern Transportation Co.	
Iowa Railway & Light Co.	2
Iowa Southern Utilities Co.	
(Burlington)	8
(Centerville)	3
(Ottumwa)	6
Mississippi Valley Electric Co.	5
Tri-City Ry.	9
Waterloo, Cedar Falls & Northern Ry.	8
Kentucky	
Kentucky Traction & Terminal Co.	27
Kentucky Coach Co.	
Kentucky Utilities Co. (Paducah)	6
Louisville Ry.	17
Kentucky Carriers, Inc.	
Michigan	
City of Detroit, Department of Street Rys.	303
Detroit United Ry.	194
Peoples Motor Coach Co.	
Grand Rapids Ry.	10
Menominee & Marinette Light & Traction Co.	1
Michigan R.R.	14
Michigan Electric Ry.	32
Muskegon Traction & Lighting Co.	2
Saginaw Transit Co.	28
Minnesota	
Duluth Street Ry.	10
Duluth-Superior Coach Co.	
Mesaba Ry.	
Mesaba Railway-Coach Co	16
Twin City Rapid Transit Co.	102
Twin City Motor Bus Co.	
Missouri	
Kansas City, Clay County & St. Joseph Ry.	16
Kansas City, Clay County & St. Joseph Auto Transit Co.	
Kansas City Public Service Co.	69
Missouri Power & Light Co.	2
Southwest Missouri R.R.	10
Springfield Traction Co.	12
United Rys. of St. Louis	40
St. Louis Bus Co.	
*West Missouri Power Co.	2
Ohio	
Cincinnati, Lawrenceburg & Aurora Electric Street Ry.	7
Cincinnati Street Ry.	67
City of Ashtabula—Division of Street Rys.	3
Cleveland Ry.	111
Cleveland, Southwestern Ry. & Light Co.	3
Southwestern Bus Co.	
Columbus Railway, Power & Light Co.	3
*Columbus, Urbana & Western Electric Ry.	2
Community Traction Co.	30
Dayton Street Ry.	3
Dayton, Springfield & Xenia Southern Ry.	2
Indiana, Columbus & Eastern Traction Co.	37
Dayton & Columbus Transportation Co.	
Lake Shore Electric Ry.	3
Nelsonville-Athens Electric Ry.	1
Nelsonville Transportation Co.	
Northern Ohio Power & Light Co.	213
Ohio Service Co.	5
Ohio Public Service Co.	3

Table I—Bus Operation by Electric Railways and Subsidiary Companies (Concluded)

	Buses Owned
Pennsylvania-Ohio Electric Co. Youngstown Municipal Ry.	120
Akron-Youngstown Bus Co.	
Cleveland-Mahoning Valley Coach Line, Inc.	
Penn-Ohio Coach Lines Co.	
Penn-Ohio Tourist Co.	
Portsmouth Public Service Co.	9
Southern Ohio Public Service Co.	14
Springfield Ry.	1
Steubenville, East Liverpool & Beaver Valley Traction Co.	4
Toledo & Indiana R.R.	1
Toledo & Northwestern Transportation Co.	
Youngstown & Ohio R.R.	4
Youngstown & Suburban Ry.	14
Columbus Bus Co.	
Youngstown & Suburban Tourist Lines, Inc.	
Youngstown & Suburban Transportation Co.	
Wisconsin	
Madison Rys.	10
Milwaukee Electric Ry. & Light Co.	133
Wisconsin Motor Bus Lines	
Wisconsin Gas & Electric Co.	10
Wisconsin Power & Light Co.	40
The Orange Line.	
Wisconsin Public Service Corp.	8
Riverview Motor Bus Co.	
Wisconsin Traction, Light, Heat & Power Co.	5
Wisconsin Valley Electric Co.	4
Alabama	
Birmingham Electric Co.	4
*Selma Electric Rys.	3
Arkansas	
Arkansas Power & Light Co.	11
Hot Springs Street Ry.	2
Intercity Terminal Ry.	6
Florida	
*Key West Electric Co.	10
Miami Beach Ry.	50
Municipal Ry. of St. Petersburg	8
Tampa Electric Co.	31
Georgia	
Augusta-Aiken Ry. & Electric Co.	(b) 1
Columbus Electric & Power Co.	22
Columbus Transportation Co.	
*Fairburn & Atlanta Ry. & Electric Co	4
Georgia Railway & Power Co.	32
Atlanta Coach Co.	
Savannah Electric & Power Co.	3
Louisiana	
Baton Rouge Electric Co.	3
New Orleans Public Service, Inc.	30
Mississippi	
Mississippi Power Co.	
(*Gulfport Division*)	20
(*Hattiesburg Division*)	7
(*Meridian Division*)	7
Mississippi Power & Light Co.	
(*Jackson Division*)	1
(*Vicksburg Division*)	2
North Carolina	
Carolina Power & Light Co.	19
Durham Public Service Co.	17
North Carolina Public Service Co.	2
Greensboro Bus Co.	
Southern Public Utilities Co.	7
Tidewater Power Co.	3
Coast City Transit Co.	
South Carolina	
South Carolina Gas & Electric Co.	8
Tennessee	
Nashville Interurban Ry.	9
Interurban Bus Co.	
Nashville Ry. & Light Co.	13
Tennessee Electric Power Co.	5
Union Traction Co.	1
Arizona	
Tucson Rapid Transit Co.	5
California	
Bakersfield & Kern Electric Ry.	6
Eureka Street Ry.	1
Key System Transit Co.	47
Los Angeles Ry.	110
Los Angeles Motor Bus Co. (c)	
Market Street Ry.	4
Municipal Ry. of San Francisco	20
Pacific Electric Ry.	125
Los Angeles Motor Bus Co. (c)	40
Pacific Gas & Electric Co.	6
Peninsular Ry.	8
San Diego Electric Ry.	15
San Francisco-Sacramento R.R.	1
San Jose Railroads	4
Santa Barbara & Suburban Ry.	8
Southern Pacific Co. (*Electric Division*)	14
Union Traction Co., Santa Cruz	4
Colorado	
Colorado Springs & Interurban Ry.	6
*Denver & Interurban R.R.	8
Denver & Interurban Motor Co.	
*Denver & South Platte Ry.	2
Denver & South Platte Transportation Co.	
Denver Tramway	4
Bus Transportation Co.	
Idaho	
*Boise Street Car Co.	4
Kansas	
Arkansas Valley Interurban Ry.	19
Arkansas Valley Transportation Co.	
Kansas Electric Power Co.	5
Kansas Public Service Co.	2
Kansas City, Leavenworth & Western Ry.	7
Leavenworth Transportation Co.	
*Salina Street Ry.	1
Topeka Ry.	23
United Power & Light Corp.	2
Wichita Railroad & Light Co.	13
Montana	
Butte Electric Ry.	3
Nebraska	
Lincoln Traction Co.	14
Omaha & Council Bluffs Street Ry.	10
Omaha, Lincoln & Beatrice Ry.	3
Omaha & Lincoln Railway & Light Co.	6
New Mexico	
City Electric Co., Albuquerque	1
North Dakota	
Northern States Power Co.	2
Northern Transit Co.	
Oklahoma	
Northeast Oklahoma R.R.	5
Oklahoma Ry.	19
Oklahoma Union Ry.	75
*Okmulgee Traction Co.	3
Tulsa Street Ry.	17
Oregon	
Portland Electric Power Co.	32
*Southern Pacific System (Salem)	3
South Dakota	
Sioux Falls Traction System	16
Utah	
Bamberger Electric R.R.	2
Utah-Idaho Central R.R.	4
Utah Light & Traction Co.	5
Washington	
Grays Harbor Ry. & Light Co.	3
Lewiston-Clarkston Transit Co.	1
Pacific Northwest Traction Co.	20
Puget Sound International Ry. & Power Co.	16
Puget Sound Power & Light Co.	7
Seattle Municipal Ry.	38
Seattle & Rainier Valley Ry.	2
Yakima Valley Transportation Co.	3
Canada	
British Columbia Electric Ry.	21
Grand River Ry.	3
Hamilton Street Ry.	10
Hydro-Electric Rys.	
(Guelph District)	1
(Peterboro District)	5
(Windsor District)	11
London Street Ry	7
Montreal Tramways	55
Ottawa Electric Ry	9
Pictou County Electric Co., Ltd.	2
Quebec Railway, Light & Power Co.	11
Toronto Transportation Commission	67
Windsor, Essex & Lake Shore Rapid Ry.	4
Winnipeg Electric Ry.	23
Woodstock, Thames Valley & Ingersoll Electric Ry.	3
Panama	
Panama Electric Co.	2
Porto Rico	
Ponce Electric Co.	4
Hawaii	
Honolulu Rapid Transit Co.	6
Total	7,749

Railroad and the Gary Railways; the Mid-State Coach Lines of the Auburn & Syracuse Electric Railroad, the Empire State Railroad and the Rochester & Syracuse Railroad. During the year, the Penn-Jersey Transit Company was organized by the Philadelphia Rapid Transit Company and the Public Service Railway of New Jersey, to furnish bus service over the recently completed Delaware River Bridge connecting the cities of Philadelphia and Camden.

MANY LARGE ORDERS PLACED DURING YEAR

In all 2,203 buses were bought in 1926. Of this number 231 vehicles were second hand.

Purchasers of new buses aggregated 1,972 during the year, only slightly less than the purchases made during 1925. Details of the individual orders are given in Table II. Additional orders totaling several hundred buses are under consideration at the present time, but details were not available when this issue went to press.

More than half of the electric railways engaged in the operation of automotive vehicles bought one or more buses during the year. The largest single purchaser was the Philadelphia Rapid Transit Company, which bought 163 buses. Second was the Department of Street Railways, City of Detroit, which ordered 142 new buses. Other large orders include 78 buses bought by the Boston Elevated Railway, 67 by the Cincinnati Street Railway, and 50 by the Miami Beach Railway. Public Service Railway of New Jersey added more than 300 buses to its equipment, but this increase included some vehicles bought second-hand from independent operators. The same was true in the case of the Virginia Electric & Power Company, which added 85 buses.

Of the large number of buses ordered in 1926, only 80 were double-decked vehicles. This is less than the number of double-deckers bought during either of the two preceding years. Detroit and Cleveland made the largest purchases of buses of this type. Others were bought by the Pacific Electric Railway, the Boston Elevated Railway, the Third Avenue Railway, New York City, and the Pittsburgh Railways. In the case of the last-mentioned property, two buses of the type operated by the London General Omnibus Company were imported from England for experimental purposes.

Table II—Buses Bought by Railways During 1926

Name of Company	Total	Total Type	Type Chassis	Body Builder	Seating Capacity
Connecticut					
Connecticut Co.	20	20	Yellow	Yellow	29
Danbury Power & Trans. Co.	10	10	Yellow	Yellow	21
Lordship Ry.	2	2	Graham	Graham	20
Maine					
York Utilities Co.	2	1	Yellow	Boston	13
		1	Yellow	....	..
Massachusetts					
Boston Elevated Ry.	78	5	International	Niagara	25
Massachusetts		30	Mack	Mack	29
Boston Elevated Ry.				Brown	29
Boston & Worcester Street Ry.				Yellow	29
Eastern Massachusetts Street Ry.				Six Wheel	61
Fitchburg & Leominster Street Ry.				Mack	29
Gardner-Templeton Street Ry.				Yellow	29
Holyoke Street Ry				Lang	..
Interstate Street Ry. (c				Brown	..
Middlesex & Boston Street Ry					
New Bedford & Onset Street Ry.				Yellow	21
Plymouth & Brockton Street Ry.				Pierce	27
Springfield Street Ry.				White	23
Union Street Ry.					
Worcester Consolidated Street Ry.				Yellow	29
				Graham	20
New Hampshire				Bender	29
Dover, Somersworth & Rochester Street Ry.				Bender	23—29
*Exeter, Hampton & Amesbury Street Ry.				Nickerson	25
*Keene Electric R		1*	Reo	Boston	20
Springfield Street Ry.	3	1	Yellow	Yellow	21
		2	Yellow	Yellow	29
Union Street Ry.	2	2	Yellow	Yellow	30
Worcester Consolidated St. Ry.	5	5	Yellow	Yellow	29
New Hampshire					
Dover, Somersworth & Rochester St. Ry.	6	6	White	Brown	29
Exeter, Hampton & Amesbury St. Ry.	5	..	....	....	..
Keene Electric Ry.	8	6	Graham	Graham	21
	2	2*	Ford	Ford	15
Laconia Street Ry.	5	..	....	....	..
Manchester & Derry St. Ry.	3	..	....	....	..
Portsmouth Electric Ry.	2	..	....	....	..
Rhode Island					
Newport Electric Corp.	2	2	Fageol	Fageol	29
Newport & Providence Ry.	2	2	White	Brown	21
United Electric Rys.	10	10	Yellow	Yellow	29
Vermont					
Burlington Traction Co.	1	1	Studebaker	Studebaker	21
District of Columbia					
Capital Traction Co.	3	2	Yellow	Yellow	21
		1	Yellow	Yellow	29
Washington Ry. & Elec. Co.	15	14	Yellow	Yellow	29
		1	Yellow	Yellow	21
Maryland					
Cumberland & Westernport Electric Ry.	1	1	White	Bender	29
Hagerstown & Frederick Ry.	15	15	International	International	18
United Railways & Elec. Co.	1	1	Studebaker	Studebaker	15
New Jersey					
Cumberland Traction Co.	6	6	Yellow	Yellow	29
Morris County Traction Co.	5	5	Fageol	Fageol	29
New Jersey Interurban Ry.	2	2	Yellow	Yellow	29
Public Service Ry.	111	61†	Yellow	Yellow	..
		50*	Yellow	Yellow	..
New York					
Cortland County Traction Co.	3	3	Brockway	Patterson	19
Fonda, Johnstown & Gloversville R.R.	1	1	Mack	Mack	25
International Ry.	25	21†	Yellow	Yellow	33
		4†	Yellow	Lang	26
Kingston Consolidated R.R.	5	5	Yellow	Yellow	29
New York State Rys. (Rochester)	19	8	White	Bender	29
		4	Mack	Bender	29
		1	Stewart	Caley-Nash	20
		1	White	Caley-Nash	20
		1	White	Bender	24
		1	Reo	Ontario	24
		1	White	N. Y. Rys.	21
		1	White	Caley-Nash	18
		1	Buick	Buick	7
New York State Rys. (Syracuse)	2	1	Mack	Bender	29
		1	White	Bender	29
New York State Rys. (Utica)	2	1	Mack	Bender	29
		1	White	N. Y. Rys.	18
Olean, Bradford & Salamanca Ry.	4	4	Fageol	Fageol	22
Peekskill Lighting & R.R. Co.	9	9	White	Bender	29
Third Avenue Ry.	5	3	Studebaker	Studebaker	21
		1	Graham	Graham	22
		1	Six Wheel	Six Wheel	59
United Traction Co of Albany	27	27†	Mack	Mack	27
Pennsylvania					
Altoona & Logan Valley Electric Ry.	9	2	White	White	25
		7	Yellow	Yellow	21
Bangor & Nazareth Transit Co.	3	2	International	Paterson	65
		1	International	Hoover	65
Bangor & Portland Transit Co.	2	2	Reo	Reo	20
Beaver Valley Traction Co.	7	5*	White	White	14
		1*	P. Arrow	P. Arrow	14
		1*	Safeway	Wolfington	29
Citizens Traction Co.	3	3	Yellow	Yellow	21
Conestoga Traction Co.	2	2	Mack	Mack	25
Erie Rys.	2	2	Yellow	Yellow	21
Johnstown Traction Co.	2	2	Yellow	Yellow	21
Lehigh Valley Transit Co.	11	6	Mack	Mack	29
		1*	Mack	Mack	29
		1*	Reo	Reo	21
		3	Yellow	Yellow	29
Lewistown & Reedsville Electric Ry.	1	1	White	Bender	29
Philadelphia Rapid Transit Co.	163	163†	Yellow	Yellow	..
Northwestern Electric Service Co.	2	..	....	....	..
Philadelphia & West Chester Traction Co.	16	15	Fageol	Fageol	29
		1	White	Kuhlman	29
Pittsburgh Rys.	19	5	Six Wheel	Thompson	29
		1	Six Wheel	Wolfington	27
		1	Six Wheel	Wolfington	29
		4	Mack	Mack	25
		2	L. G. O.	L. G. O.	52
		6	Yellow	Yellow	19
Schuylkill Ry.	3	3	Brockway	Paterson	22
Scranton Ry.	6	6	Fageol	Fageol	29
Shamokin & Edgewood Electric Ry.	3	1	Reo	Reo	21
		1	Reo	Paterson	21
		1	Paterson	Paterson	21
Southern Cambria Ry.	4	4	Reo	McKay	15
Stroudsburg Traction Co.	1	1	Garford	Garford	21
United Traction St. Ry.	2	2	Graham	Graham	21
West Chester Street Ry.	12	10	Yellow	Yellow	..
		2	Hahns	Hahns	..
West Penn Rys.	2	2	Yellow	Yellow	21
Westside Electric St. Ry.	1	1	Yellow	Yellow	21
Virginia					
Newport News & Hampton Ry., Gas & Electric Co.	1	1	Reo	Reo	21
Virginia Electric & Pwr. Co.	85	15	White	Bender	21
		18	White	Am. Car	29
		2	Yellow	Am. Car	29
		5	Reo	Fitzjohn	21
		5	White	Hoover	21
		10	Mack	Am. Car	29
		30*	Various types.		
West Virginia					
Charleston Interurban R.R.	15	6	Yellow	Yellow	25—30
		6	Yellow	Yellow	17—21
		3	Yellow	Yellow	21
Monongahela-West Penn Public Service Co.	4	4	Yellow	Yellow	21
Ohio Valley Electric Ry.	14	6	Graham	Graham	20
		1	White	White	25
		1	Denby	Denby	29
		4	Studebaker	Studebaker	21
		2	Studebaker	Studebaker	14
Wheeling Traction Co.	9	5	Studebaker	Studebaker	12
		4	Studebaker	Studebaker	7
Illinois					
Aurora, Elgin & Fox River Electric Co.	2	1	Fageol	Fageol	27
		1	Reo	Reo	21
Chicago & Joliet Elec. Ry.	3	2	Yellow	Yellow	29
		1	Yellow	Yellow	21
East St. Louis & Suburban Ry.	16	12	Yellow	Yellow	29
		1	White	Kuhlman	29
		1	Mack	St. Louis	29
		2	P. Arrow	Buffalo	29
Evanston Ry.	4	4	Yellow	Yellow	21
Illinois Power Co.	2	2	Yellow	Yellow	29
Illinois Power & Light Corp.	34	24	....	....	21
		7	....	....	25
		3	....	....	21
Rockford & Interurban Ry.	6	4	Yellow	Yellow	29
	..	2	Yellow	Yellow	21
Indiana					
Chicago, South Bend & Northern Ind. Ry.	5	5	Studebaker	Auto	21
Indianapolis Street Ry.	4	4	Yellow	Yellow	29
Indiana Service Corp.	23	6*	Fageol	Fageol	30
		3*	White	Bender	26
		1*	Fageol	Fageol	26
		1*	Studebaker	Fremont	15
		1*	Studebaker	Fremont	18
		4*	Studebaker	Clark	15
		2*	Studebaker	Miller	12
		3	International	Lang	24
		2	International	Lang	28
Shore Line Motor Coach Co.	53	..	....	....	..
		..	....	....	..
Southern Indiana Gas & Electric Co.	10	6	Graham	Graham	21
		4	Yellow	Yellow	29
Terre Haute, Indianapolis & Eastern Traction Co.	17	9*	Mack	Mack	..
		5*	Mack	Mack	..
		3	Fageol	Fageol	..

Table II—Buses Bought by Railways During 1926 (Continued)

Name of Company	Total	Total Type	Type Chassis	Body Builder	Seating Capacity
Union Traction Co. of Indiana	31	12	Mack	Mack	25
		4	Mack	Eckland	25
		5	Fageol	Fageol	29
		10	White	Kuhlman	25
Iowa					
Des Moines City Ry.	3	3	White	Bender	25
Fort Dodge, Des Moines & Southern R.R.	2	2	Yellow	Yellow	29
Iowa Southern Utilities Co. (Burlington)	4	4	Mack	Mack	26
Iowa Southern Utilities Co. (Ottumwa)	6	6	Mack	Mack	25
Tri-City Ry.	9	2†	Mack	Mack	25
		1	Mack	Mack	29
		6	Mack	Mack	21
Kentucky					
Kentucky Traction & Terminal Co.	20	11	Yellow	Yellow	21
		1*	U. S.	U. S.	15
		2*	Reo	Reo	19
		1*	Reo	Reo	15
		5*	Reo	Reo	14
Kentucky Utilities Co. (Paducah)	6	2*	Reo	Reo	21
		1*	Reo	Reo	19
		3	Yellow	Yellow	21
Michigan					
Department of Street Rys., Detroit	142	41*	Yellow	Yellow	29
		50†	Fageol	Amer. Car	[illegible]
		50	Graham	Graham	21
		1	Fageol	Amer. Car	60
Detroit United Ry.	14	12	Fageol	Fageol	27
		2	Graham	Graham	12
Menominee & Marinette Light & Traction Co.	1	1	Yellow	Yellow	21
Minnesota					
Duluth Street Ry.	1	1	White	Eckland	14
Twin City Rapid Transit Co.	11	7†	Yellow	Eckland	..
		1	Mack	Eckland	25
		3	White	Eckland	25
Missouri					
Springfield Traction Co.	4	3	Yellow	Yellow	21
		1	Graham	Graham	21
Ohio					
Cincinnati, Lawrenceburg & Aurora Electric St. R.R.	3	3*	Mack	Mack	25
Cincinnati Street Ry.	67	29	Mack	Bender	29
		18	Safeway	Kuhlman	29
		7	Schacht	Kuhlman	29
		13	Mack	Mack	29
Cleveland Ry.	51	30	White	Kuhlman	29
		20	Six Wheel	Six Wheel	62
		1	Six Wheel	Six Wheel	29
Cleveland Southwestern Ry. & Light Co.	3	3	White	Kuhlman	24
Columbus Railway, Power & Light Company	3	3†	Mack	Mack	11
Community Traction Co.	30	6	Mack	Mack	25
		12	Mack	Mack	29
		12	White	Kuhlman	29
Indiana, Columbus & Eastern Traction Co.	1	1	Fageol	Fageol	22
Nelsonville-Athens Electric Ry.	1	1	Reo	Reo	21
Northern Ohio Power & Light Co.	71	1	N.O.P. & L.	Kuhlman	29
		6	Mack	Mack	29
		16	Yellow	Yellow	29
		20	Six Wheel	Kuhlman	29
		2	Six Wheel	Hoover	59
		8	Six Wheel	Six Wheel	27
		5*	Mack	Mack	29
		5	Yellow	Lang	30
		5	Mack	Lang	29
		3*	Studebaker	Superior	19
Ohio Public Service Co.	3	2	Yellow	Yellow	21
		1*	Yellow	Yellow	21
Pennsylvania-Ohio Electric Co.	36	15	White	Bender	29
		13	Fageol	Fageol	29
		3	Fageol	Fageol	29
		5	Yellow	Yellow	25
Southern Ohio Public Service Co.	1	1	Studebaker	Cambridge	19
Youngstown & Suburban Ry.	2	2	Fageol	Fageol	22
Wisconsin					
Madison Rys.	4	4*	Stoughton	Stoughton	[illegible]
Milwaukee Electric Railway & Light Co.	20	3	Fageol	Fageol	26
		3	Yellow	Yellow	29
		14	Yellow	Yellow	29
Wisconsin Power & Light Co.	11	3	Yellow	Yellow	29
		3	Fageol	Fageol	29
		5	Menominee	Menominee	21
Wisconsin Public Service Corp.	5	3	Yellow	Yellow	21
		2	Reo	Reo	21
Wisconsin Traction, Light, Heat & Power Co.	7	7*	....	....	16—25
Arkansas					
Arkansas Power & Light Co.	2	2	Yellow	Yellow	21
Florida					
Key West Electric Co.	6	6	Yellow	Yellow	21
Miami Beach Ry.	50	36†	Fageol	Fageol	29
		14	Yellow	Yellow	21
Municipal Ry. of St. Petersburg	8	8	Yellow	Yellow	21
Georgia					
Columbus Electric & Power Co.	7	7	Studebaker	Gibraltar	21
Georgia Ry. & Power Co.	10	10	Yellow	Yellow	21
Louisiana					
New Orleans Public Service Inc.	14	14†	Fageol	St. Louis	29
Mississippi					
Mississippi Power Co., Gulfport	12	12	Mack	Mack	..
Mississippi Power & Light Co.	2	1	White	Bender	21
		1	Yellow	Yellow	21
North Carolina					
Carolina Power & Light Co.	7	7†	Fageol	Fageol	30
Durham Public Service Co.	6	2	Reo	Fitzjohn	21
		4	Yellow	Yellow	21
Southern Public Utilities Co.	5	5	Yellow	Yellow	21
Tennessee					
Nashville Interurban Ry.	9	8	International	Burkett	..
		1	International	Lang	15
Nashville Railway & Light Co.	13	13	Yellow	Yellow	29
California					
Bakersfield & Kern Electric Ry.	1	1	Studebaker	Studebaker	12
Key System Transit Co.	27	14	Fageol	Fageol	28
		5	Yellow	Amer. Car	28
		2	Yellow	Yellow	29
		3	Yellow	Yellow	21
		3	Reo	Reo	21
Los Angeles Ry.	35	3	Yellow	Yellow	21
		4	Yellow	Yellow	29
		8	Yellow	Yellow	63
		8	Fageol	Fageol	59
		1	Fageol	Fageol	21
		9	Fageol	Fageol	29
		1	White	White	25
		1†	Yellow	Yellow	29
Market Street Ry.	3	3	Fageol	Fageol	29
Municipal Railway of San Francisco	7	2	White	White	29
		2	Fageol	Fageol	29
		2	Mack	Mack	29
		1	Miscellaneous		
Pacific Electric Ry.	3	3	Fageol	Fageol	58
Pacific Gas & Electric Co.	1	1	Moreland	Moreland	16
San Diego Electric Ry.	3	3	Fageol	Fageol	29
Santa Barbara & Suburban Ry.	4	3	Mack	Mack	25
		1	Fageol	Fageol	29
Southern Pacific Co.	11	3	Mack	Mack	29
		8	White	Fischer	25
Union Traction Co., Santa Cruz	4	4	Reo	Reo	21
Colorado					
Colorado Springs & Interurban Ry.	6	6	Yellow	Yellow	21
Denver Tramway	1	1	Yellow	Yellow	21
Denver & South Platte Ry.	2	2	Graham	Graham	21
Idaho					
Boise Street Car Co.	4	4	....	....	..
Kansas					
Arkansas Valley Interurban Ry.	1	1	Studebaker	Studebaker	14
Kansas City, Leavenworth & Western Ry.	1	1	Mack	Mack	25
Montana					
Butte Electric Ry.	3	2	Fageol	Fageol	29
		1	P. Arrow	Brown	29
Nebraska					
Lincoln Traction Co.	14	12	Mack	Mack	25
		2	Studebaker	Studebaker	21
Omaha & Council Bluffs Street Ry.	3	3	Douglas	Weir	21
Omaha, Lincoln & Beatrice Ry.	3	3	White	Bender	21
North Dakota					
Northern States Power Co.	2	2	Reo	Reo	21
Oklahoma					
Oklahoma Ry.	9	4	Yellow	Yellow	21
		5	Reo	Reo	21
Oklahoma Union Ry.	49	17	Reo	Reo	21
		13	Mack	Mack	25
		16	Graham	Graham	15
		1	Studebaker	Studebaker	15
		1	International	International	15
		1	Buick	Buick	12
Tulsa Street Ry.	3	3	Yellow	Yellow	21
Oregon					
Portland Electric Power Co.	9	7	Yellow	Yellow	33
		1	Mack	Mack	29
		1	Yellow	Yellow	29
South Dakota					
Sioux Fall Traction System.	2	1	Garford	Garford	15
		1	White	Eckland	19
Texas					
Austin Street Ry.	1	1	Yellow	Yellow	21
Dallas Ry. & Terminal Co.	7	7	Graham	Graham	21
Eastern Texas Electric Co.	4	4	Graham	Graham	21
El Paso Electric Co.	3	2	Studebaker	Miller	21
		1	Yellow	Yellow	21

Table II—Buses Bought by Railways During 1926 (Concluded)

Name of Company	Total	Total Type	Type Chassis	Body Builder	Seating Capacity
Galveston Electric Co......	4	3	Studebaker	Studebaker	16
		1	Yellow	Yellow	17
Houston Electric Co.......	15	2	Mack	McKay	29
		4	Yellow	Yellow	21
		1	Yellow	Yellow	27
		3	Reo	International	15
		2	Yellow	Yellow	33
		2	Yellow	Yellow	29
		1*	Studebaker	Gilbraltar	21
Northern Texas Traction Co	4	2	Yellow	Yellow	21
		2	Reo	Fitzjohn	21
San Antonio Public Service Co....................	14	1	Studebaker	Gilbraltar	22
		3	Reo	Fitzjohn	21
		1	P. Arrow	Bender	29
		9	Yellow	Yellow	21
Southwestern Traction Co..	3	1	Graham	Graham	12
		2	Hudson	Hudson	7
Wichita Falls Traction Co..	8	4	Reo	Reo	20
		4	Graham	Graham	20
Utah					
Bamberger Electric R.R.....	2	2	Yellow	Yellow	25—29
Utah Idaho Central R.R...	2	1	Fageol	Fageol	25
		1	Mack	Mack	29
Utah Light & Traction Co..	2	2	Mack	Duralyte	29
Washington					
Puget Sound Power & Light Co....................	24	2	Fageol	Fageol	..
		1	Yellow	Yellow	17—21
		5*	Pierce	Local	23
		4*	Fageol	Fageol	22
		2*	White	Local	14—22
		1*	Fageol	Fageol	27
		1*	Yellow	Yellow	17—21
		2*	Fageol	Fageol	19
		3*	Fageol	Fageol	25
		3*	Fageol	Fageol	20
Seattle Municipal Ry......	14	5	Reo	Fitzjohn	21
		5	Garford	Garford	21
		2	White	Ry. Co.	29
		2	Garford	Ry. Co.	29
Yakima Valley Transportation Co....................	2	2	Mack	Mack	29
Canada					
British Columbia Electric Ry., Ltd...............	3	3	Fageol	Fageol	33
Hamilton Street Ry.......	10	10	Yellow	Nat. Steel	21
London Street Ry.........	6	6	Yellow	Yellow	21
Montreal Tramways.......	31	19	Yellow	Yellow	29
		6	Yellow	Yellow	21
		6	Reo	Ottawa	21
Ottawa Electric Ry........	5	4	Reo	Ottawa	21
		1	Reo	Ottawa	22
Pictou County Electric Co., Ltd..................	2	2	International	International	20
Toronto Transportation Commission............	24	10	Yellow	Yellow	29
		9	Yellow	T. T. C.	29
		5	Yellow	Yellow	21
Windsor, Essex & Lake Shore Rapid Ry.........	2	2	Gotfredson	Gotfredson	25
Winnipeg Electric Co......	4	3	Reo	Reo	21
		1	Studebaker	Studebaker	..
Woodstock, Thames Valley & Ingersoll Electric Ry...	1	..	....	....	..
Porto Rico					
Ponce Electric Co.........	1	1	Reo	Fitzjohn	22
Total...............	2,203				

*Second-hand.
† Gas-electric.

Table III—Bus Route Extensions During 1926

Name of Railway	City Miles	Intercity Miles	Replaced Miles
Connecticut			
Connecticut Co.	14.63	12.79	1.76
Lordship Ry.	.....	3.70	.....
Massachusetts			
Boston Elevated Ry.	11.16	.....	8.61
Boston & Worcester Street Ry	6.00	14.00	6.00
Eastern Massachusetts Street Ry.	0.60	18.31	15.40
Gardner-Templeton Street Ry.	.....	10.00	10.00
Middlesex & Boston Street Ry.	.....	29.39	.....
Springfield Street Ry.	.....	15.50	17.00
Union Street Ry.	2.10	.....	.....
Worcester Consolidated Street Ry.	.....	5.30	5.30
New Hampshire			
Keene Electric Ry.	12.00	5.00	.....
Manchester & Derry Street Ry.	.....	8.37	.....
Rhode Island			
Newport & Providence Ry.	1.50	.....	1.50
Vermont			
Burlington Traction Co.	0.33	.....	.....
District of Columbia			
Capital Traction Co.	.....	8.00a	.....
Washington Railway & Electric Co.	6.36	.....	.....
New York			
Fonda, Johnstown & Gloversville R.R.	.....	37.00	.....
International Ry.	.....	13.83	.....
Kingston Consolidated R.R.	7.00	.....	3.00
New York State Rys.	4.20	.....	1.35
Olean, Bradford & Salamanca Ry.	.....	9.00	9.00
United Traction Co. of Albany	6.52	.....	6.63
Pennsylvania			
Citizens Traction Co.	2.85	.....	2.85
Conestoga Traction Co.	3.20	.....	.....
Erie Rys.	4.50	.....	.....
Lehigh Valley Transit Co.	2.18	13.64	11.90
Philadelphia & West Chester Traction Co.	.....	18.00	.....
Shamokin & Edgewood Electric Ry.	4.00	.....	.....
Southern Cambria Ry.	.....	39.50	.....
West Penn Rys	0.76	.....	.....
Westside Electric Street Ry.	3.00	7.00	.....
West Virginia			
Charleston Interurban R.R.	4.00	.....	.....
Wheeling Traction Co.	.....	57.00	.....
Illinois			
Chicago, North Shore & Milwaukee R.R.	1.60	48.50b	.....
Chicago & West Towns Ry.	2.50	.....	.....
East St. Louis & Suburban Ry	5.66	72.20	2.90
Evanston Ry	8.00	.....	.....
Chicago & Joliet Electric Ry.	7.00	.....	.....
Illinois Power Co.	4.68	.....	.....
Illinois Power & Light Corp.	75.00	.....	.....
Indiana			
Chicago, South Bend & Northern Indiana Ry.	4.20	.....	.....
Indianapolis Street Ry.	6.06	.....	.....
Southern Indiana Gas & Electric Co.	7.00	.....	.....
Terre Haute, Indianapolis & Eastern Trac. Co.	13.17	148.00	.....
Union Traction Co. of Indiana	10.05	81.40	3.60
Iowa			
Des Moines City Ry	7.48	.....	.....
Iowa Southern Utilities Co.	7.75	.....	8.00
Tri City Railway	4.80	.....	.....
Kentucky			
Kentucky Traction & Terminal Co.	7.70	.....	.....
Louisville Ry.	3.10	.....	.....
Michigan			
Department of Street Rys., Detroit	109.97	.....	.....
Grand Rapids Ry.	0.80	.....	.....
Minnesota			
Duluth Street Ry.	3.28	.....	.....
Twin City Rapid Transit Co.	15.30	12.00	.....
Missouri			
Springfield Traction Co.	3.40	.....	3.40
United Rys.	2.81	1.09	.....
Ohio			
Cincinnati Street Ry.	69.75	.....	1.80
Cleveland Ry.	24.16	.....	1.10
Cleveland Southwestern Railway & Light Co.	.....	10.30	10.30
Columbus, Urbana & Western Electric Ry.	.....	7.50	7.50
Community Traction Co.	15.22	.....	4.59
Indiana, Columbus & Eastern Traction Co.	.....	55.00	.....
Nelsonville-Athens Electric Ry.	5.00	.....	.....
Northern Ohio Power & Light Co.	15.49	.....	1.49
Pennsylvania-Ohio Electric Co.	4.00	181.00	.....
Wisconsin			
Madison Rys.	3.75	.....	0.75
Wisconsin Power & Light Co.	9.65	35.00	1.20
Wisconsin Public Service Corp.	0.68	6.00	6.00
Florida			
Key West Electric Co	2.66	.....	2.70
Miami Beach Ry.	36.00	.....	.....
Georgia			
Columbus Electric & Power Co.	4.10	.....	3.60
Georgia Railway & Power Co.	.....	4.42c	.....
Louisiana			
Baton Rouge Electric Co.	1.00	.....	.....
New Orleans Public Service, Inc.	8.30	.....	.....
Mississippi			
Mississippi Power Co., Gulfport	.....	31.00	22.50
North Carolina			
Carolina Power & Light Co.	8.60	.....	.....
Durham Public Service Co.	2.13	.....	.....
Tennessee			
Nashville Interurban Ry	.....	192.00	.....
Tennessee Electric Power Co.	7.30	.....	.....
Arizona			
Tucson Rapid Transit Co.	5.00	.....	.....
California			
Bakersfield & Kern Electric Ry.	0.50	.....	.....
Key System Transit Co.	3.96	.....	.....
Los Angeles Ry.	13.96	.....	.....

Table III—Bus Route Extensions During 1926 (Concluded)

Name of Railway	City Miles	Intercity Miles	Replaced Miles
Market Street Ry.	3.86	.....	.....
Pacific Electric Ry.	4.50	.....	.....
San Diego Electric Ry.	2.00	.....	.....
Union Traction Co.	3.50	.....	3.50
Colorado			
Colorado Springs & Interurban Ry.	5.00	30.00a	2.53
Denver & South Platte Ry.	.....	4.50	4.25
Idaho			
Boise Street Car Co.	5.50	.....	.....
Nebraska			
Omaha & Council Bluffs Street Ry	2.02	.....	.....
Omaha, Lincoln & Beatrice Ry	.....	5.50	0.63
North Dakota			
Northern States Power Co	3.00	.....	.....
Oklahoma			
Northeast Oklahoma Ry.	.....	9.33	.....
Oklahoma Ry.	6.70	.....	.....
Oklahoma Union Ry.	.....	18.00	.....
Tulsa Street Ry.	1.70	.....	.....
South Dakota			
Sioux Falls Traction System	.....	90.00	.....
Texas			
Austin Street Ry.	4.38	.....	.....
Dallas Railway & Terminal Co	6.88	.....	.....
Eastern Texas Electric Co.	9.00	.....	.....
Galveston Electric Co.	.....	36.00d	.....
Galveston-Houston Electric Co.	12.80	.....	.....
Houston Electric Co.	27.25	30.00a	.....
Northern Texas Traction Co.	3.20	.....	.....
San Antonio Public Service Co.	14.60	.....	3.39
Southwestern Traction Co.	10.50	.....	10.50
Utah			
Utan Idaho Central R.R.	.....	27.00	.....
Utah Light & Traction Co	.....	7.50	8.74
Washington			
Puget Sound Power & Light Co.	.....	216.50	.....
Seattle Municipal Ry.	6.25	.....	.....
Southern Pacific R.R.	4.80	1.90	.....
Yakima Valley Transportation Co.	3.10	.....	.....
Canada			
Hamilton Street Ry.	7.00	.....	.....
Hydro-Electric Railways	10.36	.....	.....
London Street Ry.	6.85	.....	0.50
Montreal Tramways	22.45	.....	.....
Toronto Transportation Commission	3.30	83.00	.....
Windsor, Essex & Lake Shore Rapid Ry.	.....	50.00	.....
Winnipeg Electric Co.	1.75	.....	.....
Total	841.66	1,827.17	215.17

a—Sightseeing.
b—Does not include sightseeing.
c—1.62 mi sightseeing included.
d—20.00 mi. sightseeing included.

Gas-electric busés to the number of about 396 were ordered by electric railways during the year just ended. This number was somewhat larger than the number for the preceding year, when orders totaled approximately 370. Moreover, the distribution of railways ordering gas-electrics was wider. Important purchases during the year include 163 gas-electrics for the Philadelphia Rapid Transit Company, 61 for the Public Service Railway, 50 for the Department of Street Railways, City of Detroit; 36 for the Miami Beach Railway; eighteen for the International Railway, Buffalo, and fourteen for the New Orleans Public Service, Inc.

Of the new buses ordered during the year about one-half had seating capacities from 27 to 30, inclusive. This was by far the most popular size. Medium-sized buses ranging in seating capacity from 19 to 21 numbered about 500. Small buses of seating capacities from 13 to 16 were few in number. Those over 30, not including the double-deck buses with seating capacities from 50 to 65, were also comparatively few. Various other odd sizes were included in the list.

In addition to the new buses ordered from manufacturers during the year, the electric railways have acquired more than 200 buses by purchase of lines already existing. In many cases the equipment thus acquired has been retired from service and new vehicles purchased. In other instances, while the old equipment remains in operation it is planned to replace it at the earliest practicable moment. An outstanding feature of the survey this year is the number of buses junked. Altogether 47 electric railways report approximately 160 buses retired from service.

NEW ROUTES ARE EXTENSIONS RATHER THAN REPLACEMENTS

Much new bus route mileage was added during the year. In all 116 companies report bus route extensions totaling about 2,650 miles on which regular service is given. Besides that there have been about 60 miles of extensions to sightseeing routes. Replacement of rail service by bus service has occurred on only 215 miles of route, or less than 9 per cent of the route mileage added during the year.

Adding the figures for 1926 to those for preceding years, it is found that approximately 100 railways have replaced cars by buses on parts of their systems. Rail service on approximately 940 miles of track has been superseded by bus service. Some 25 electric railways having about 450 miles of track have suspended rail service altogether and now operate only buses. An additional 75 railways with 900 miles of track have suspended all service and a certain measure of transportation service is now furnished by buses under different management. Thus the bus has replaced the car on a total of 2,300 miles of track. The bus routes operated by electric railways total more than 15,000 miles. From this it will be seen that replacement of rail service has been a minor factor in the expansion of bus service.

AUTOMOTIVE SERVICE EQUIPMENT ORDERS LARGEST IN RECENT YEARS

Together with the large purchases of buses already mentioned, electric railways in 1926 ordered 347 automotive vehicles of various kinds for other than passenger-carrying purposes. This was a substantial increase over the figure of 284 automotive service vehicles bought in 1925. In 1924 such purchases amounted to 105, in 1923 they were 148, and 112 in 1922.

Trucks for miscellaneous haulage purposes were the most numerous. Seventeen freight and express trucks and ten tractors were ordered, and a considerable number of line and tower trucks also were bought. An interesting commentary on the development of bus operation by electric railways is found in the number of automotive snow plows ordered. Four companies ordered eleven such vehicles. Two tank trucks were purchased for use in conjunction with buses. In size the service equipment ranged from ½ ton to 14½ tons. The most popular size was the 1-ton truck, with 2½-ton and 5-ton sizes about even for second place in popularity.

The largest single purchaser of automotive service equipment was the Boston Elevated Railway, which ordered 95 trucks of various types. Other large orders included the Chicago, North Shore & Milwaukee Railroad, 22; Brooklyn City Railroad, 21; Brooklyn-Manhattan Transit Corporation, 20; Key System Transit Company, 18, and Toronto Transportation Commission, 15. Altogether 53 electric railways reported such orders.

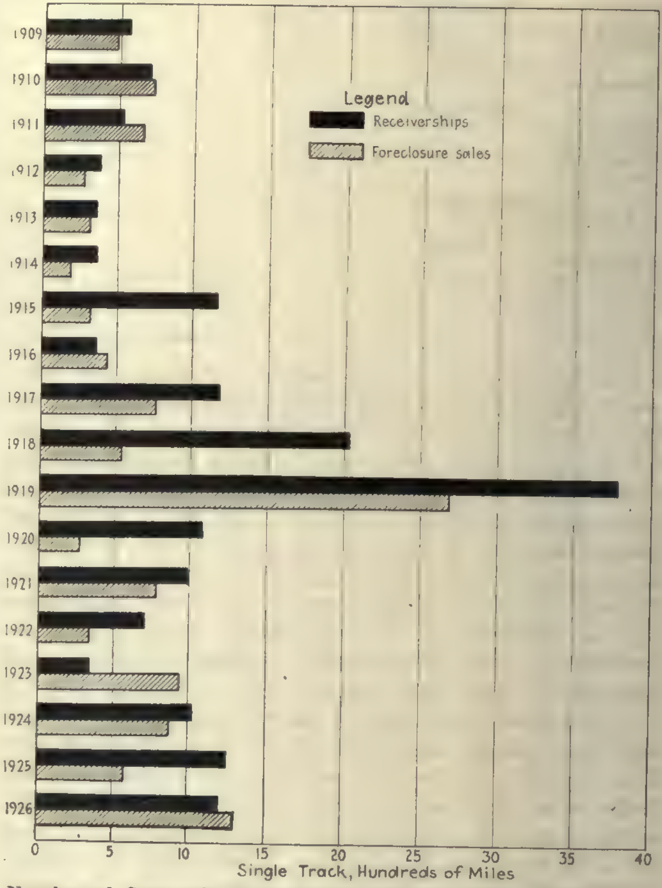
No trackless trolleys were reported as having been ordered by electric railways in the year just ended.

Fewer Electric Railways in Receivership

Mileage of Properties Defaulting Have Little More than Half the Mileage of Those Included in 1925 Record—Even Including Chicago Railways the Total Is Reduced—Twenty Companies Emerged from Receivership and Nine Others Were Foreclosed and Should Come Out in 1927

WITH the passing of another year electric railways in receivership are still on the wane, the number having been decreased in 1926 to 55 companies. Twenty companies, comprising 1,060 miles of track, emerged from receivership and twelve others were sold at foreclosure and may be expected to emerge in 1927. Railways going into receivership in 1926 as a result of financial difficulties comprise a total of about 640 miles, or 620 miles less than in 1925.

The Chicago Railways, with 590 miles of track, is not included in the above figures, as the receivership in this instance is in no way attributable to the financial results of operation. This was a voluntary receivership to conserve the property at the expiration of a franchise. The property is physically in fine condition and has broken all former traffic and revenue records. The increase in gross revenue and passengers carried for 1926 ran better than 4 per cent above 1925, and public relations are more satisfactory than at any time in the company's history. A complete summary of this situation was published in the Dec. 25, 1926, issue of ELECTRIC RAILWAY JOURNAL, page 1124.



Number of Companies Entering Receivership During 1926 Was Slightly Less Than In The Previous Year Although Foreclosure Sales More Than Doubled

Table I—Electric Railway Receiverships—1926

	Miles of Single Track Involved	Outstanding Securities		
		Stock	Bonds	Receivers' Certificates
Milford & Uxbridge Street Ry., Milford, Mass.	35.00	$540,000	$500,000	None
Geneva, Seneca Falls & Auburn R.R., Geneva, N. Y.	12.00	157,100	507,000	None
Olean, Bradford & Salamanca Ry., Olean, N. Y.	100.00	3,808,000	472,818	None
Northern Cambria Ry., Patton, Pa.	13.00	250,000	250,000	None
Chicago Rys., Chicago, Ill.	591.16	100,000	103,228,255	None
Rockford, Beloit & Janesville Ry., Rockford, Ill.	(a)	(a)	907,000	None
Rockford City Traction Co., Rockford, Ill.	(a) 36.17	(a)	(a)	None
Rockford & Interurban Ry., Rockford, Ill.	76.00	4,000,000	2,175,500	None
Kankakee & Urbana Traction Co., Urbana, Ill.	26.00	(b)	(b)	(b)
Mississippi Valley Electric Co., Iowa City, Iowa	9.00	592,835	184,500	$2,000
Grand Rapids, Grand Haven & Muskegon Ry., Grand Rapids, Mich.	44.09	1,200,000	1,500,000	None
Minneapolis, Anoka & Cuyuna Range Ry., Minneapolis, Minn.	18.23	300,000	380,000	None
Southwest Missouri R.R., Webb City, Mo.	90.00	5,000,000	2,341,000	None
Sharon & Newcastle Street Ry., Youngstown, Onio	17.00	120,000	120,000	None
Denver & Interurban R.R., Denver, Colo.	45.63	101,500	1,079,000	None
Utah Idaho Central R.R., Ogden, Utah	115.00	1,600,000	3,913,000	None
Total for 1926 (16 Cos)	1,228.28	17,769,435	117,558,073	2,000

(a) Included with Rockford & Interurban Ry.
(b) Information not available.

Table II—Record of Electric Railway Receiverships

Year	Number of Companies	Miles of Single Track Involved	Outstanding Securities	
			Stock	Bonds
1909	22	558.00	$29,962,200	$22,375,000
1910	11	696.61	12,629,400	75,490,735
1911	19	518.90	29,533,450	38,973,293
1912	26	373.58	20,410,700	11,133,800
1913	18	342.84	31,006,900	47,272,200
1914	10	362.39	35,562,550	19,050,460
1915	27	1,152.10	40,298,050	39,372,375
1916	15	359.26	14,476,600	10,849,200
1917	21	1,177.32	33,918,725	33,778,400
1918	29	2,017.61	92,130,388	163,257,102
1919	48	3,781.12	321,259,354	312,915,104
1920	19	1,065.31	28,758,455	72,283,575
1921	19	986.42	32,909,525	36,177,800
1922	14	695.43	18,140,150	20,304,400
1923	12	333.63	8,332,100	14,707,066
1924	12	1,021.88	28,489,700	35,716,000
1925	14	1,260.07	51,383,195	54,696,525
1926	16	1,228.28	17,769,435	117,560,073

Table III—Record of Electric Railway Foreclosure Sales

Year	Number of Companies	Miles of Track Involved	Outstanding Securities		
			Stocks	Bonds	Receivers' Certificates
1909	21	488.00	$22,265,700	$21,174,000	(a)
1910	22	724.36	19,106,613	26,374,075	(a)
1911	25	660.72	91,354,800	115,092,750	(a)
1912	18	267.18	14,197,300	10,685,250	(a)
1913	17	302.28	15,243,700	19,094,500	(a)
1914	11	181.26	26,239,700	44,094,241	(a)
1915	19	308.31	30,508,817	16,759,997	(a)
1916	19	430.14	13,895,400	22,702,300	(a)
1917	26	745.19	27,281,900	27,313,045	(a)
1918	23	524.22	37,740,325	20,149,384	(a)
1919	29	2,675.48	89,893,400	79,836,738	$42,300
1920	13	259.90	7,782,400	11,227,328	52,000
1921	13	777.97	33,642,255	30,863,526	5,000
1922	13	322.88	7,491,500	12,640,600	114,683
1923	15	927.45	118,077,959	110,638,250	12,265,000
1924	14	869.25	21,022,800	34,845,535	3,440,388
1925	13	569.39	18,074,300	18,329,555	53,000
1926	28	1,291.17	20,054,700	57,340,363	214,000

(a) Data not available.

Table IV—Electric Railway Receiverships as of Dec. 31, 1926

	Year of Receivership	Miles of Single Track	Outstanding Securities		
			Capital Stock	Funded Debt	Receivers' Certificates
New England States					
CONNECTICUT					
Hartford & Springfield Street Ry., Warehouse Point	1918	48.00	$785,000	$961,000	None
MASSACHUSETTS					
Boston & Worcester Street Ry., Framingham	1925	83.00	2,482,200	2,520,000	None
Milford & Uxbridge Street Ry., Milford	1925	35.00	540,000	500,000	None
Milford, Attleboro & Woonsocket Street Ry., Springfield (1)	1924	29.73	315,000	300,000	None
NEW HAMPSHIRE					
Portsmouth, Dover & York Street Ry., Portsmouth (1)	1917	12.00	....	707,000	$30,000
Net receiverships Dec. 31, 1926, (5 Cos.)		207.73	4,122,200	4,988,000	30,000
Eastern States					
DISTRICT OF COLUMBIA					
Washington-Virginia Ry	1923	40.00	2,378,300	5,614,000	None
NEW JERSEY					
Morris County Traction Co., Morristown	1923	68.98	300,000	4,179,000	None
NEW YORK					
Binghamton Ry., Binghamton	1925	49.52	978,895	2,807,200	None
Brooklyn Heights R.R., Brooklyn	1919	5.10	200,000	250,000	None
Buffalo & Lackawanna Traction Co., Buffalo	1918	8.80	55,000	1,000,000	None
Hamburg Ry., Buffalo	1920	21.72	None	750,000	$27,000
Geneva, Seneca Falls & Auburn R.R., Geneva	1926	12.00	157,100	507,000	None
Ithaca Traction Corporation, Ithaca	1924	11.62	400,000	763,000	None
Long Island Electric Ry., Jackson Heights (2)	1924	24.97	600,000	600,000	None
New York & Queens County Ry., Jackson Heights	1923	34.98	3,235,000	1,509,000	None
Manhattan & Queens Traction Corp., Long Island City	1917	21.66	20,000	25,946	None
Second Avenue R.R., New York	1908	23.96	1,862,000	5,682,000	$3,140,000
Staten Island Midland Ry., New York	1920	28.68	1,000,000	1,000,000	3,000
Steinway Railway, New York	1922	31.11	None	1,500,000	None
Westchester Street Ry. (3)	1920	17.92	700,000	168,000	None
Ogdensburg Street Ry., Ogdensburg	1922	7.74	150,000	150,000	None
Olean, Bradford & Salamanca Ry., Olean	1926	100.00	3,808,000	472,818	None
Penn Yan & Lake Shore Ry., Penn Yan	1918	8.50	94,000	100,000	None
Net receiverships Dec. 31, 1926, (18 Cos.)		517.26	15,938,295	27,068,964	3,170,000
Central States					
ILLINOIS					
Chicago & Interurban Traction Co., Chicago	1922	50.00	1,000,000	1,816,000	None
Chicago Rys., Chicago	1926	591.16	100,000	103,228,255	None
Peoria Railway Terminal Co., Peoria (4)	1922	25.28	1,000,000	2,444,000	None
Rockford, Beloit & Janesville Ry., Rockford	1926	(7)	(7)	907,000	None
Rockford City Traction Co., Rockford	1926	36.17	(7)	(7)	None
Rockford & Interurban Ry., Rockford	1926	76.00	4,000,000	2,175,500	None
INDIANA					
Union Traction Co. of Indiana, Anderson	1924	447.20	11,500,000	15,197,000	None
Indianapolis & Cincinnati Traction Co., Indianapolis	1925	101.00	3,600,000	2,400,000	112,000
IOWA					
Mississippi Valley Electric Co., Iowa City	1926	9.00	592,835	184,500	$2,000
KENTUCKY					
Owensboro City R.R., Owensboro	1923	12.50	75,000	400,000	None
MICHIGAN					
Detroit United Ry., Detroit	1925	613.89	15,375,000	29,745,500	None
Grand Rapids, Grand Haven & Muskegon Ry., Grand Rapids	1926	44.09	1,200,000	1,500,000	None
Houghton County Traction Co., Houghton	1921	32.15	957,200	660,000	None
Michigan Railroad, Jackson	1924	173.84	4,000,000	8,050,000	None
MINNESOTA					
Wahpeton-Breckenridge Street Ry., Breckenridge (5)	1925	1.00	42,500	None	None
St. Paul Southern Electric Ry., Hastings	1918	17.54	658,225	425,400	None
Minneapolis, Anoka & Cuyuna Range Ry., Minneapolis (4)	1926	18.23	300,000	380,000	None
Mesaba Railway, Virginia	1924	38.00	2,260,000	1,581,000	None
MISSOURI					
Kansas City, Lawrence & Topeka Electric Ry., Kansas City	1919	12.00	250,000	400,000	None
Missouri Electric R.R., St. Louis	1919	20.97	1,000,000	700,000	None
United Railways Co. of St. Louis	1919	462.88	41,296,000	52,590,000	None
Southwestern Missouri R.R., Webb City	1926	90.00	5,000,000	2,341,000	None
OHIO					
Cincinnati, Lawrenceburg & Aurora Electric Street R.R., Cincinnati	1913	31.67	808,900	750,000	None
Indiana, Columbus & Eastern Traction Co., Springfield	1921	201.49	4,025,000	7,900,000	$200,000
Sharon & New Castle St., Ry., Youngstown (6)	1926	17.00	120,000	120,000	None
Net receiverships Dec. 31, 1926 (25 Cos.)		3,123.06	99,160,660	235,895,155	314,000
Western States					
COLORADO					
Denver & Interurban R.R., Denver	1926	45.63	101,500	1,079,000	None
KANSAS					
Kansas City, Kaw Valley & Western Ry., Bonner Springs	1924	42.31	740,500	1,374,500	None
Joplin & Pittsburg Ry., Pittsburg	1924	94.52	7,000,000	3,078,500	None
MONTANA					
Helena Light & Railway Co., Helena (4)	1925	18.50	935,000	878,000	None
OKLAHOMA					
Oklahoma Railway, Oklahoma City	1924	138.45	5,595,900	5,815,000	None
Tulsa Street Ry., Tulsa	1925	23.00	580,000	771,000	None
UTAH					
Salt Lake City & Utah R.R., Salt Lake City	1925	96.71	5,043,700	2,611,292	100,000
Net receiverships Dec. 31, 1926 (7 Cos.)		459.12	19,996,600	15,607,292	100,000
Recapitulation for United States					
Net receiverships Dec. 31, 1926 (55 Cos.)		4,307.17	139,217,755	283,559,411	3,6[illegible]4,000

(1) All the property has been sold and assets being distributed. Receiver not yet discharged.

(2) Sold at foreclosure sale and now being operated by the Jamaica Central Rys. Receiver not yet discharged.

(3) Sold at foreclosure sale to the Third Avenue Ry. Receiver not yet discharged.

(4) Sold at foreclosure sale.

(5) Operations abandoned in 1925. Receiver not yet discharged.

(6) Operations abandoned.

(7) Included in Rockford & Interurban Ry. figures.

Thus taking as a measure of the industry's condition only those railways involved in financial difficulties, there are 15 new companies which went into receivership in 1926. These represent $17,769,435 capital stock and $14,329,818 bonds, or about one-fourth the value of stocks and bonds involved last year.

Including the Chicago Railways, the total of the 1926 receiverships is 1,228.28 miles, or slightly less than that in 1925; capital stock $17,769,435, only a little more than one-third the amount of capital involved in last year's figures. Also, the companies terminating receivership in 1926 exceed those of 1925 by about 150 miles.

Reorganization of the Kansas City Railways was consummated this year, the property now being operated as the Kansas City Public Service Company. Besides the Chicago Railways, this leaves only one large city property in receivership, the United Railways of St. Louis. Plans are now being perfected for termination of receivership of this property. The St. Louis Public Service Company was organized and stands ready to take over operation of the St. Louis properties as soon as a satisfactory franchise can be worked out.

The Utah-Idaho Central Railroad, which went into receivership Aug. 20, 1926, was sold at receiver's sale on Nov. 5 to a committee representing 99 per cent of the outstanding mortgage holders and the receivership was terminated.

On March 8, 1926, the Cincinnati & Dayton Traction Company receivership was ended, and immediately following acquisition of the property by the reorganized company, the Cincinnati, Hamilton & Dayton Railway, an extensive improvement program was inaugurated.

The property of the Dayton, Springfield & Xenia Southern Railway was taken over on Aug. 1 by the Dayton-Xenia Railway, organized for that purpose.

Two companies, the St. Louis & Alton Railway, with $1,000,000 capital stock, and the Alton Railway, with $750,000, were organized to take over and operate the Alton, Granite & St. Louis Traction Company, receivership of which was terminated.

The Cumberland & Westernport Transit Company was organized to take over the property of the Cumberland & Westernport Electric Railway and receiver discharged Oct. 1.

The Grand Rapids, Holland & Chi-

Table V—Receiverships Terminated and Foreclosure Sales During 1926

Receivers Discharged With or Without Foreclosure Sales or Following Abandonment	Miles of Single Track	Outstanding Securities: Stocks	Outstanding Securities: Bonds	Outstanding Securities: Receivers' Certificates	
Danbury & Bethel Street Ry., Danbury, Conn.	13.00	$320,000	$588,500	$100,000	Sold at foreclosure sale and reorganized as the Danbury Power & Transportation Co.
Connecticut Valley Street Ry., Greenfield, Mass.	47.05	621,000	580,000	None	Property liquidated.
Laconia Street Ry., Laconia, N. H.	8.00	140,000	91,000	None	Property dismantled.
Barre & Montpelier Traction & Power Co., Montpelier, Vt.	9.75	50,000	None	None	Sold at foreclosure sale to Vergennes Power Co.
Cumberland & Westernport Electric Ry., Frostburg, Md.	25.00	625,000	655,000	None	Sold at foreclosure sale and reorganized as the Cumberland & Westernport Transit Co.
North Jersey Rapid Transit Co., Hohokus, N. J.	18.00	800,000	800,000	None	Sold to Public Service Ry., Newark, N. J.
Hornell Traction Co., Hornell, N. Y.	10.90	117,900	150,000	None	Sold at foreclosure sale, operation abandoned and bus service substituted.
New York & Long Island Trac. Co., Jackson Heights, N. Y.	52.62	1,000,000	1,000,000	None	Sold at foreclosure sale and operations abandoned.
North Branch Transit Co., Bloomsburg, Pa.	30.00	500,000	532,500	45,000	Sold at foreclosure sale in 1925. Property taken over by North Branch Bus Co., railway service abandoned and buses substituted.
Northern Cambria Ry., Patton, Pa.	13.00	250,000	250,000	None	Sold at foreclosure sale and property dismantled.
Alton, Granite & St. Louis Trac. Co., East St. Louis, Ill.	62.00	3,189,000	3,000,000	None	Sold at foreclosure sale and reorganized as the Alton Railway and the St. Louis & Alton Ry.
Kankakee & Urbana Traction Co., Urbana, Ill.	26.00	(*a*)	(*a*)	(*a*)	Sold at foreclosure sale and property now being dismantled.
Fort Wayne, Van Wert & Lima Trac. Co., Fort Wayne, Ind.	61.63	1,000,000	1,470,000	None	Sold at foreclosure sale and reorganized.
Grand Rapids, Holland & Chicago Ry., Jackson, Mich.	80.93	1,324,700	1,500,000	21,000	Property sold in receivership sale and operations abandoned.
Kansas City Rys., Kansas City, Mo.	317.84	100,000	29,957,800	None	Sold at foreclosure sale and reorganized as the Kansas City Public Service Co.
Dayton, Covington, & Piqua Trac. Co., West Milton, Ohio	34.00	1,150,000	550,000	18,000	Sold at foreclosure sale and operations abandoned.
Dayton, Springfield & Xenia Southern Ry., Dayton, Ohio.	27.97	250,000	250,000	None	Sold at foreclosure sale and reorganized as the Dayton-Xenia Ry.
Cincinnati & Dayton Traction Co., Hamilton, Ohio	91.07	1,250,000	3,250,000	None	Sold at foreclosure sale and reorganized as the Cincinnati, Hamilton & Dayton Ry.
Hocking-Sunday Creek Traction Co., Nelsonville, Ohio	14.99	223,000	300,000	None	Sold at foreclosure sale in 1925 and reorganized as the Nelsonville-Athens Electric Ry. Receiver discharged this year.
Utah Idaho Central Railroad Co., Ogden, Utah	115.00	160,000	3,913,000	None	Sold at receiver's sale and receivership terminated.
Total of receiverships terminated (20 cos.)	1,058.75	13,070,600	48,837,800	184,000	
Sold at Foreclosure Sale But Receiver Not Yet Discharged					
Milford, Attleboro & Woonsocket Street Ry., Milford, Mass.	29.73	315,000	300,000	None	Assets being distributed.
Portsmouth, Dover & York Street Ry., Portsmouth, N. H.	12.00	....	707,000	30,000	Operations abandoned in 1924.
Long Island Electric Ry., Jackson Heights, N. Y.	24.97	600,000	600,000	None	Operated by the Jamaica Central Rys.
Westchester Street R.R., New York, N. Y.	16.32	700,000	168,000	None	Sold to Third Avenue Ry.
Peoria Railway Terminal Co., Peoria, Ill.	25.28	1,000,000	2,444,000	None	
Rockford, Beloit & Janesville Ry., Rockford, Ill.	(*a*)	(*a*)	$907,000	None	Sold at foreclosure and reorganization pending.
Rockford City Traction Co., Rockford, Ill.	36.17	(*a*)	(*a*)	None	
Rockford & Interurban Ry., Rockford, Ill.	76.00	$4,000,000	2,175,500	None	
Minneapolis, Anoka & Cuyuna Range Ry., Minneapolis, Minn.	18.23	300,000	380,000	None	
Sharon & New Castle Street Ry., Youngstown, Ohio	17.00	120,000	120,000	None	
Denver & Interurban R.R., Denver, Colo.	45.63	101,500	1,079,000	None	Operations abandoned and bus service substituted.
Helena Light & Railway Co.	18.50	935,000	878,000	None	
Total of foreclosure sales without receivers discharge (12 cos.)	319.83	8,071,500	9,758,500	30,000	
Foreclosures Without Receiverships in 1926					
Philadelphia & Easton Transit Co.	32.00	546,600	364,400	None	
Lebanon-Thornton Traction Co.	10.00	150,000	150,000	None	
Cleveland, Painesville & Eastern R.R.	38.76	(*a*)	(*a*)	(*a*)	
Total foreclosures without receiverships (3 cos.)	80.76	696,600	514,400	None	

(*a*) Information not available.

cago Railway was sold at receivership sale in October. Shortly afterward all operations were suspended and the receiver was discharged.

Eight companies, comprising 255.45 miles of track, terminated receiverships and are no longer operating. The Laconia Street Railway and the Northern Cambria Railway have already been dismantled and the Kankakee & Urbana Traction Company is now being dismantled. The Hornell Traction Company and the North Branch Transit Company abandoned railway operations and inaugurated bus service in the territory formerly covered by the railways. Other companies which abandoned operations are the Connecticut Valley Street Railway, the New York & Long Island Traction Company and the Dayton, Covington & Piqua Traction Company.

The largest of the companies which went into receivers' hands because of financial difficulties were the Utah-Idaho Central Railroad, with 115 miles of track; the Olean, Bradford & Salamanca Railway, with 100 miles; the Southwestern Missouri Railroad, with 92 miles, and the Rockford & Interurban Railway, 78 miles.

The largest properties in receivership at the close of 1926 are the Detroit United Railway, with 613.89 miles; the United Railways of St. Louis, with 463.18 miles; the Chicago Railways and the Union Traction Company of Indiana, with 450.53 miles.

Included in Table I for 1926 was the Tiffin & Fostoria Railway, Tiffin, Ohio. Information received from the company this year resulted in its being dropped from Table IV in this issue. The property was sold to the Toledo, Fostoria & Findlay Railway in 1925, and was never in receivership.

Three properties in Rockford, Ill., went into receivership last year—the Rockford & Interurban Railway, the Rockford, Beloit & Janesville Electric Railway and the Rockford City Traction Company. A plan of reorganization has already been submitted to the bondholders and all the properties have gone through foreclosure proceedings. This leaves only the final reorganization steps to be perfected before the companies terminate receiverships.

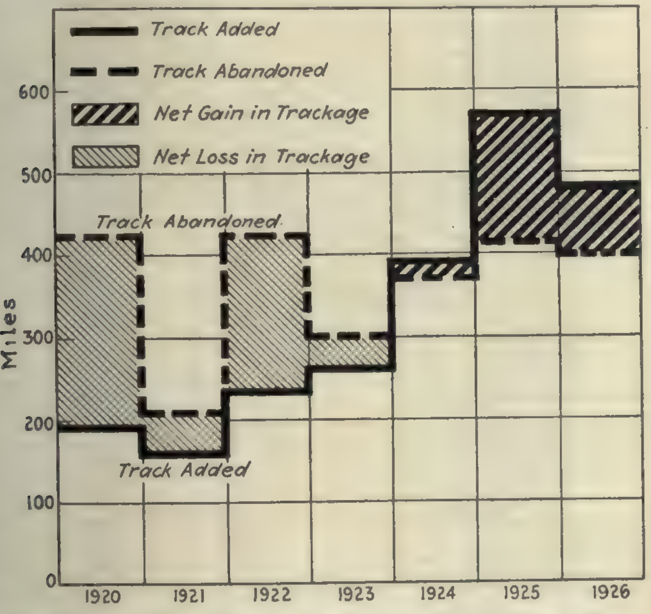
The Connecticut Valley Street Railway property was abandoned about two years ago. Early in 1926 the receiver completed the distribution of the assets and was released by the court.

Another reorganization pending at the present time is that proposed for the Second Avenue Railroad, New York City. This company went into receiver's hands in 1908, and is the oldest. A plan has already been proposed to sell the property at public auction in January and form two separate corporations to control the real estate and railway properties of the company.

Marked Increase in Track Activity During Year

Mileage of Extensions and Reconstruction in 1926 Was 20 Per Cent Greater than in 1925—Largest Increase Was in Rebuilt Interurban Track—Less Electrification of Steam Railroads Occurred than During the Preceding Year—Track Abandonments Were Lower—Total Electrified Mileage Showed Substantial Gain

INCREASED activity in electric railway track reconstruction, both city and interurban, was one of the outstanding developments of 1926, as indicated by the figures of this year's annual survey. The mileage of track rebuilt during the past year exceeded that of 1925 by nearly 40 per cent. Approximately the same mileage of extensions was built in 1926 as in 1925. Steam railroad electrification during the year amounted to about two-thirds of that done the year before. The total of all trackwork, including extensions, reconstruction and electrification, was 1,290 miles, as compared with 1,155 miles in 1925, an increase of about 12 per cent. Abandonments were somewhat less than those of the preceding year. As a result of these various factors an important gain was made in the total electrified track mileage of the country. This marked the third successive year in which the additions to trackage exceeded the abandonments.



Net Gain in Electrified Trackage During Past Three Years Has Offset Much of Earlier Loss

Interurban track rebuilt during the year totaled more than 200 miles. Electric railways to the number of 63 reported having done work of this kind as compared with 46 companies in 1925 reporting 93 miles rebuilt. City track reconstruction during 1926 amounted to nearly 600 miles, as against 486 miles the year before. The number of railways making such improvements increased from 160 to 181. In all over 800 miles of electric railway track were rebuilt in 1926, an increase of 216 miles over the 1925 figure. Details of the work done by individual companies are given in Table I.

Extensions made during the past year amounted to 218 miles, or approximately the same as the preceding year. Of this amount 193 miles were city extensions, a slight decrease from 1925, when such extensions totaled 227 miles, and interurban extensions were 125 miles, or slightly more than the year before, when the corresponding figure was 112 miles. City extensions were reported this year by 75 companies, as compared with 80 the year before. Interurban extensions were made by 38 companies as against 35 in 1925. Names of companies making extensions are given in Table I, together with the miles of track added. An accompanying chart shows graphically the comparative mileage of reconstruction and extensions of electric railway tracks by years since 1919.

Comparison of Track Construction by Years

Year	No. of Companies	Track Extensions—Miles City	Inter-urban	Total	Track Rebuilt—Miles City	Inter-urban	Total	Electrified Steam Lines Miles
1908	157	(a)	(a)	1174.5	(a)	(a)	(a)	84.00
1909	160	(a)	(a)	774.7	(a)	(a)	(a)	112.40
1910	217	(a)	(a)	1204.8	(a)	(a)	(a)	192.40
1911	223	(a)	(a)	1105.0	(a)	(a)	(a)	86.50
1912	171	(a)	(a)	869.4	(a)	(a)	(a)	80.80
1913	181	(a)	(a)	974.9	(a)	(a)	(a)	119.00
1914	163	(a)	(a)	716.5	(a)	(a)	(a)	229.00
1915	136	(a)	(a)	596.0	(a)	(a)	(a)	448.20
1916	104	115.40	240.90	356.30	(a)	(a)	(a)	388.00
1917	121	251.10	125.60	376.70	(a)	(a)	375.40	66.00
1918	80	216.41	97.41	313.82	(a)	(a)	155.43	275.70
1919	73	110.90	29.67	140.57	307.06	82.82	389.89	287.60
1920	87	145.69	30.87	176.56	246.21	115.56	361.77	8.92
1921	78	108.15	38.95	147.10	488.96	126.25	615.21	8.08
1922	104	126.27	85.11	211.38	584.75	154.95	739.70	12.35
1923	272	169.61	63.54	233.15	559.77	294.86	854.63	26.12
1924	243	218.09	93.99	312.08	585.51	178.82	764.33	83.39
1925	207	227.31	112.48	339.79	485.75	93.15	578.90	236.36
1926	236	193.20	124.76	317.96	594.35	208.17	802.52	169.52

(a) Information not available.

Electrification of steam railroads totaling 170 miles in 1926 was reported by nine companies. In 1925 four companies reported 236 miles of steam railroad track electrified. Of the mileage recently converted to electric operation, the greater part belonged to the Virginian Railway, which electrified 135 miles. Other developments of this character were limited to small amounts. Figures for individual companies follow:

Electrified Steam Railroad Extensions

	Single Track Miles
Virginian Railway	135.30
Long Island Railroad	17.71
Niagara, St. Catharines & Toronto Railway	10.96
Oklahoma Railways	2.73
Pacific Electric Railway	1.30
Northeast Oklahoma Railroad	1.16
Chicago, Milwaukee & Pacific Railroad	.17
New York, New Haven & Hartford Railroad	.17
Denver & Intermountain Railroad	.02
Total	169.52

Less track was abandoned last year than in the year before. Only 36 miles of city track was abandoned by electric railways, which continued operation of the ma-

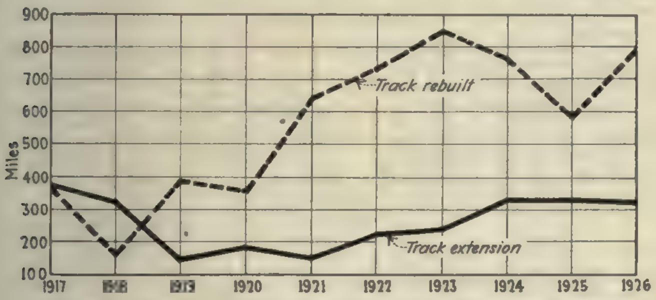
Table I—Track Extensions and Reconstruction in 1926

Name of Company	Extension Miles City	Extension Miles Inter-urban	Rebuilt Miles City	Rebuilt Miles Inter-urban
Connecticut				
Connecticut Co.	4.04	0.90	21.33	9.73
New York, New Haven & Hartford R. R.	....	.49	....	....
Maine				
Bangor Hydro-Electric Co.	....	....	1.66	....
York Utilities Co.	....	....	0.75	....
Massachusetts				
Berkshire Street Ry.	....	....	0.87	3.03
Boston Elevated Ry.	0.70	....	17.56	....
Eastern Massachusetts Street Ry.	1.20	....	8.15	4.56
East Taunton Street Ry.	1.48	10.00	0.25	2.50
Greenfield & Montague Transportation Area	....	....	0.50	....
Holyoke Street Ry.	....	....	1.05	....
Massachusetts Northeastern Street Ry.	....	....	0.40	3.00
Middlesex & Boston Street Ry.	....	....	....	3.54
Milford & Uxbridge Street Ry.	....	....	....	4.00
Springfield Street Ry.	0.27	....	3.22	2.68
Union Street Ry.	....	....	1.12	0.36
Worcester Consolidated Street Ry.	....	....	1.10	0.25
New Hampshire				
Berlin Street Ry.	....	....	2.00	....
Manchester Street Ry.	....	....	1.14	....
Rhode Island				
United Electric Rys.	1.24	0.09	4.56	3.68
Vermont				
Burlington Traction Co.	....	....	0.11	....
Springfield Terminal Ry.	....	....	....	2.00
Vergennes Power Co.	....	....	....	1.50
District of Columbia				
Capital Traction Co.	....	....	1.45	....
Washington Railway & Electric Co.	....	....	5.56	....
Maryland				
United Rys & Electric Co.	1.18	....	14.60	....
New Jersey				
Cumberland Traction Co.	....	....	2.00	....
Morris County Traction Co.	....	....	1.33	....
Pennsylvania-New Jersey Ry.	....	....	0.75	....
Public Service Railway	1.00	....	....	....
Trenton & Mercer County Traction Corp.	....	....	....	3.52
New York				
Brooklyn City R.R.	....	....	11.24	....
Brooklyn-Manhattan Transit Corp.	....	....	12.00	....
City of New York	....	....	0.97	....
Elmira Water, Light & Railroad Co.	....	....	4.00	....
Empire State R. R.	....	....	0.16	....
Erie County Traction Corp.	....	....	0.57	....
Fonda, Johnson & Gloversville R.R.	....	....	0.52	....
Interborough Rapid Transit Co.	1.18	....	....	....
International Ry.	.73	....	.45	....
Jamaica Central Rys.	0.75	....	0.80	....
Jamestown Street Ry.	....	....	0.25	4.00
New York & Queens County Ry.	0.09	....	1.03	....
New York & Stamford Ry.	....	....	....	2.21
New York Rys.	....	....	3.00	....
New York State Rys.	....	....	8.10	....
New York, Westchester & Boston Ry.	....	3.58	....	....
Richmond Light & R.R. Co.	....	....	0.77	....
Rochester, Lockport & Buffalo R.R.	....	....	....	1.06
Rochester & Syracuse R.R.	....	....	....	0.64
Rome Railway & Lighting Co.	....	....	0.50	....
Schenectady Ry.	....	....	1.55	....
Third Ave. Ry.	....	....	8.58	....
United Traction Co.	....	....	1.38	....
Warren & Jamestown Street Ry.	....	....	0.34	....
Pennsylvania				
Chambersburg & Shippensburg Ry.	2.00	9.00	....	....
Conestoga Traction Co.	....	....	0.67	0.43
Erie Rys.	0.37	....	1.14	....
Homestead & Miffin Street Ry.	....	....	....	0.50
Lehigh Valley Transit Co.	....	0.11	2.98	0.14
Hanover & McSherrytown Street Ry.	....	....	0.33	....
Harrisburg Rys.	....	....	2.08	....
Hershey Transit Co.	....	....	....	14.00
Mauch Chunk Transit Co.	....	....	0.76	....
Philadelphia & West Chester Traction Co.	....	0.29	....	....
Pittsburgh Rys.	2.78	0.32	25.59	2.62
Reading Transit Co.	....	....	1.30	3.00
Schuylkill Ry.	....	....	0.67	....
Scranton Ry.	0.28	....	2.06	2.16
Shamokin & Mt. Carmel Transit Co.	0.54	....	....	....
Southern Cambria Ry.	....	....	1.00	....
Trenton, Bristol & Philadelphia Street Ry	....	....	5.50	....
West Penn Rys.	0.15	....	....	2.02
Westside Electric Street Ry.	....	....	2.00	....
Williamsport Passenger Ry.	1.31	....	0.21	....
York Rys.	....	....	0.25	....
Virginia				
Danville Traction & Power Co.	....	....	2.00	....
Newport News & Hampton Railway, Gas & Electric Co.	....	....	1.13	....
Virginia Electric & Power Co.	4.00	....	8.37	....
West Virginia				
Ohio Valley Electric Ry.	....	....	7.57	1.90
Illinois				
Aurora, Elgin & Fox River Electric Co.	0.29	....	1.29	....
Chicago, Aurora & Elgin R.R.	....	....	....	29.30
Chicago & Joliet Electric Ry.	....	....	....	1.33
Chicago, North Shore & Milwaukee R.R.	....	48.74	1.40	1.30
Chicago Rapid Transit Co.	....	....	9.70	....
Chicago Surface Lines	5.34	....	37.44	....
Chicago & West Towns Ry.	....	....	3.50	....
East St. Louis & Suburban Ry.	0.23	....	1.70	2.30
Evanston Ry.	1.58	....	....	..
Illinois Power Co.	....	....	0.84	....
Illinois Power & Light Corp.	....	....	4.30	..
Illinois Traction System	....	....	....	4.41
North Kankakee Street Ry.	....	....	0.35	..
Rockford City Traction Co.	0.27	....	4.60	....
Indiana				
Chicago, South Bend & Northern Indiana Ry.	....	....	0.99	...
Gary Rys.	....	0.50	....	...
Indianapolis Street Ry.	6.00	....	4.70	...
Indiana Service Corp.	0.74	1.47	1.80	3.85
Northern Indiana Power Co.	....	....	0.36	....
Southern Indiana Gas & Electric Co.	0.34	....	2.75	....
Terre Haute, Indianapolis & Eastern Traction Co.	....	....	2.39	0.38
Union Traction Co. of Indiana	0.94	0.23	1.08	....
Iowa				
Cedar Rapids & Marion City Ry.	....	....	1.00	....
Des Moines City Ry.	1.50	0.20	2.00	....
Iowa Southern Utilities Co. (Ottumwa)	....	....	0.25	....
Sioux City Service Co.	0.76	....	0.07	....
Tri-City Ry. of Iowa	....	0.19	0.64	0.78
Kentucky				
Kentucky Traction & Terminal Co.	....	....	0.60	....
Kentucky Utilities Co.	....	....	0.38	....
Louisville Ry.	0.27	....	3.83	0.30
Michigan				
Department of Street Rys., Detroit	3.01	....	15.46	....
Detroit United Ry.	1.95	0.25	4.60	8.60
Duluth Street Ry.	2.70	....	0.67	....
Grand Rapids Ry.	0.36	....	3.45	....
Michigan Electric Ry.	....	0.19	....	....
Minnesota				
Twin City Rapid Transit Co.	5.00	....	5.40	....
Missouri				
City Light & Traction Co.	....	....	0.19	....
Kansas City, Clay County & St. Joseph Ry.	....	....	....	0.75
Kansas City Public Service Co.	....	....	6.00	....
Missouri Power & Light Co.	....	....	0.67	....
St. Joseph Railway, Light, Heat & Pwr. Co.	....	....	1.95	...
United Rys of St. Louis	0.09	1.53	13.12	0.44
Ohio				
Cincinnati, Hamilton & Dayton Ry.	....	1.60	2.40	....
Cincinnati, Newport & Covington Ry.	....	....	0.27	....
Cincinnati Street Ry.	....	8.20	11.31	....
City of Ashtabula, Division of Street Rys	....	....	0.45	....
City Ry., Dayton	....	....	4.17	....
Cleveland Ry.	4.08	....	8.46	....
Cleveland Southwestern Railway & Lt. Co.	....	....	....	12.00
Columbus, Delaware & Marion Electric Co.	....	....	....	4.00
Dayton & Troy Elec. Ry.	....	....	....	.57
Dayton & Western Traction Co.	....	0.35	....	0.50
Lancaster Traction & Power Co.	....	....	0.09	....
Lima-Toledo R. R.	....	0.19	...	....
Northern Ohio Pwr. & Light Co.	0.22	0.19	2.00	1.00
Pennsylvania-Ohio Electric Co.	....	....	0.30	....
Peoples Ry., Dayton	....	....	1.20	....
Southern Ohio Public Service Co.	0.37	....	....	0.55
Steubenville, East Liverpool & Beaver Valley Traction Co.	....	....	1.70	0.95
Western Ohio Ry.	....	....	0.50	....
Wisconsin				
Lake Superior District Power Co.	....	....	0.40	....
Madison Rys.	0.25	....	0.50	....
Milwaukee Elec. Ry. & Light Co.	5.24	9.00	10.52	8.11
Milwaukee Northern Ry.	....	....	0.15	....
Wisconsin Power & Light Co.	....	....	1.42	0.71
Alabama				
Alabama Power Co.	....	....	4.83	....
Birmingham Electric Co.	0.79	....	12.77	....
Mobile Light & Railroad Co.	....	....	1.27	....
Arkansas				
Arkansas Power & Light Co.	0.37	....	0.63	...
Forth Smith Light & Traction Co.	....	....	4.50	....
Southwestern Gas & Electric Co.	....	....	2.60	....
Florida				
Coral Gables Rapid Transit Co.	12.00	....	....	....
Miami Beach Railway	3.70	8.10	....	6.00
Georgia				
Georgia Railway & Power Co.	1.40	0.15	6.74	....
Savannah Electric & Power Co.	0.40	....	0.87	....
Louisiana				
New Orleans Public Service, Inc.	1.97	....	4.86	....
Shreveport Rys.	....	....	0.07	....
South New Orleans Light & Traction Co.	....	....	0.83	....
Mississippi				
Mississippi Power Co., Gulfport	....	....	2.25	....
North Carolina				
Carolina Power & Light Co.	....	....	0.41	....
North Carolina Public Service Co.	....	....	1.00	....
Tidewater Power Co.	....	....	1.20	....
South Carolina				
Charleston Consolidated Ry. & Lighting Co.	....	....	0.40	....
South Carolina Gas & Electric Co.	....	....	0.57	....
Tennessee				
Knoxville Power & Light Co.	....	....	0.54	....
Memphis Street Ry.	0.48	....	4.33	....
Nashville Ry. & Lt. Co.	0.60	....	10.73	....
Tennessee Electric Power Co.	....	....	1.60	....

Table I—Track Extensions and Reconstruction in 1926 (Concluded)

Name of Company	Extension Miles City	Extension Miles Inter-urban	Rebuilt Miles City	Rebuilt Miles Inter-urban
California				
Bakersfield & Kern Electric Ry.	....	....	0.20	....
Central California Traction Co.	....	....	....	1.25
Key System Transit Co.	2.39	1.47	25.98	....
Los Angeles Ry.	2.46	....	17.03	....
Market Street Ry.	....	....	2.40	....
Municipal Ry. of San Francisco	1.13	....	1.98	....
Pacific Electric Ry.	2.20	7.30	1.30	28.20
Sacramento Northern Ry.	....	1.12	....	0.69
San Diego Electric Ry.	1.15	....	2.85	....
San Francisco, Napa & Calistoga Ry.	....	....	....	0.60
Southern Pacific R.R.	....	0.35	....	0.69
Colorado				
Denver & Intermountain R.R.	....	....	....	0.05
Denver Tramway Corp.	....	....	1.36	....
Kansas				
Arkansas Valley Interurban Ry.	....	0.06	....	....
Kansas City, Lawrence & Topeka Elec. R.R.	....	....	0.06	....
Kansas City, Leavenworth & Western Ry.	....	0.17	....	....
Topeka Ry.	....	....	1.00	....
Union Traction Co.	....	....	2.00	1.00
Nebraska				
Lincoln Traction Co.	....	....	0.40	....
Omaha & Council Bluffs Street Ry.	....	....	3.00	....
Omaha, Lincoln & Beatrice Ry.	....	....	0.09	....
North Dakota				
Northern States Power Co.	....	....	0.36	....
Oklahoma				
Northeast Oklahoma R.R.	....	1.16	....	....
Oklahoma Rys.	....	0.51	0.20	....
Tulsa Street Ry.	....	....	0.60	....
Oregon				
Portland Electric Power Co	0.22	1.44	1.06	....
Texas				
Abilene Traction Co.	....	....	0.20	....
Dallas Ry. & Terminal Co.	3.88	....	5.64	....
Eastern Texas Electric Co.	....	....	0.69	....
El Paso Electric Co.	0.16	....	....	....
Galveston Electric Co.	....	....	1.00	....
Houston Electric Co.	0.30	....	3.82	...
Laredo Electric & Railway Co.	0.06	....	0.40	...
Northern Texas Traction Co.	....	....	3.36	...
Rio Grande Valley Traction Co.	....	....	0.99	..
San Antonio Public Service Co.	....	....	0.86	....
Texas Electric Ry.	....	....	....	0.53
Utah				
Utah-Idaho Central R.R.	....	....	...	...
Utah Light & Traction Co.	0.35	....	4.49	....
Washington				
Grays Harbor Railway & Light Co.	....	....	0.34	....
Puget Sound Power & Light Co.	0.50	....	0.80	....
Seattle Municipal Ry.	1.75	....	2.20	....
Yakima Valley Transportation Company	....	....	1.00	....
Canada				
British Columbia Electric Ry.	3.71	....	2.65	....
Canadian National Rys.	....	0.64	....	..
Hamilton Street Ry.	....	....	2.00	...
Hull Electric Co.	0.08	0.11	....	....
Hydro-Electric Power Commission	2.14	....	1.34	.
Levis Tramways	....	....	0.28	..
London Street Ry.	....	....	0.58	.
Montreal & Southern Counties Ry.	....	....	0.20	2.33
Montreal Tramways	9.94	0.92	14.50	2.40
New Brunswick Power Co.	....	....	0.50	....
Newfoundland Light & Pwr. Co.	3.18	....	....	1.00
Niagara, St. Catharines & Toronto Ry.	0.61	1.91	5.61	0.27
Nova Scotia Tramways & Pwr. Co.	0.55	....	0.12	.
Ottawa Electric Ry.	....	....	0.50	1.00
Port Arthur Civic Ry	1.00	....	....	....
Quebec Railway, Light & Power Co.	1.30	....	2.32	....
Sherbrooke Railway & Power Co.	....	....	0.34	....
Three Rivers Traction Co.	....	....	0.22	....
Toronto Transportation Commission	1.29	....	1.50	....
Winnipeg Electric Co.	0.86	2.09	0.76	....
Hawaii				
Honolulu Rapid Transit Co.	....	....	0.08	....
Porto Rico				
Porto Rico Railway, Light & Power Co.	....	....	6.00	....
Total	193.20	124.76	594.35	208.17

jor portions of their systems, as compared with 114 miles in 1925. Interurban track amounting to 160 miles was abandoned during the past year by companies which continued to operate elsewhere. Similar abandonments in 1925 totaled 128 miles. Table II shows the trackage abandoned by various railways during the year.

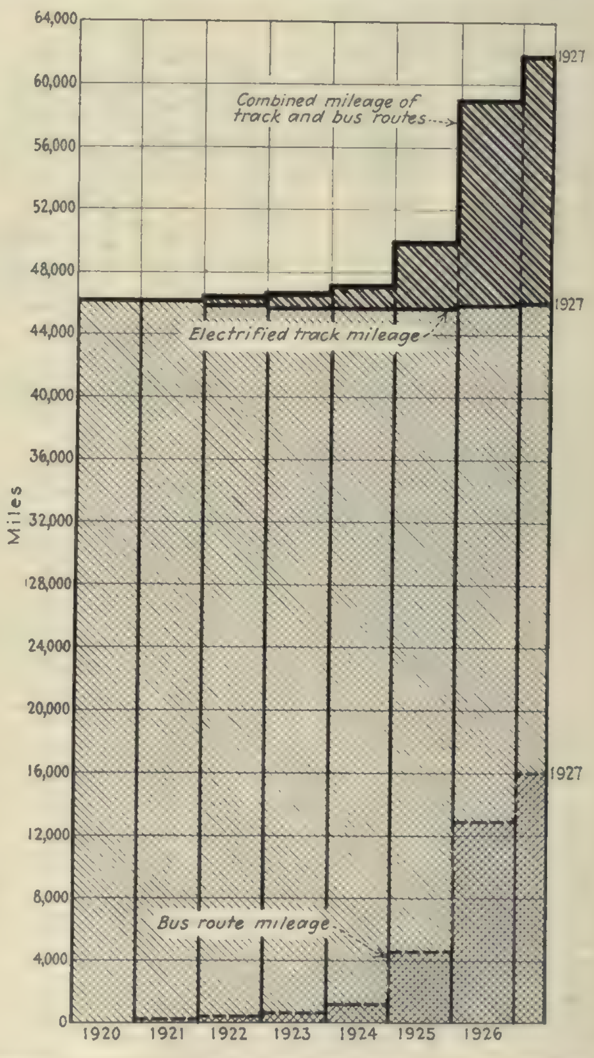


Railways Were Active in Track Reconstruction in 1926. Extensions Remained About the Same

Entire properties abandoned in 1926 numbered fifteen with 206 miles of track. During the preceding year seventeen railways with 174 miles of track were entirely abandoned. In some cases bus operation under the same management replaced the rail operation, as indicated in the article on bus development which is

should be given attention. Declines in building activity, in automobile production and in commodity prices, the effects of low cotton prices, the unfavorable agri-

Denver & Interurban Railroad	11.30
Exeter, Hampton & Amesbury Street Railway	22.00
Gardner-Templeton Street Railway	10.00
Hornell Traction Company	9.64
Hudson River & Eastern Traction Company	2.81
Iron River, Stambaugh & Crystal Falls Street Railway	6.00
Kankakee & Urbana Traction Company	26.00
Manchester & Derry Street Railway	8.37
Nelson Street Railway	4.00
North Branch Transit Company	26.60
Northern Cambria Railway	13.00
Peekskill Lighting & Railroad Company	7.84
Sheridan Railway	16.50
Total	205.86



Combined Mileage of Track and Bus Routes Is Now One-Third Larger than in 1920 published elsewhere in this issue. In other cases no regular transportation is now furnished on the abandoned routes.

In all, less electric railway trackage was abandoned in 1926 than in 1925, the totals being 401 and 416 miles respectively. Track abandonments were less by 86 miles than the additions made during the same period. Thus 1926 showed a substantial net gain in the electrified track mileage of the country. Electric railways have added some 15,000 miles of bus routes during the past five years, as shown on an accompanying chart. From this it will be seen that at present transportation is furnished by electric railways on a combined total of over 61,000 miles of track and bus routes.

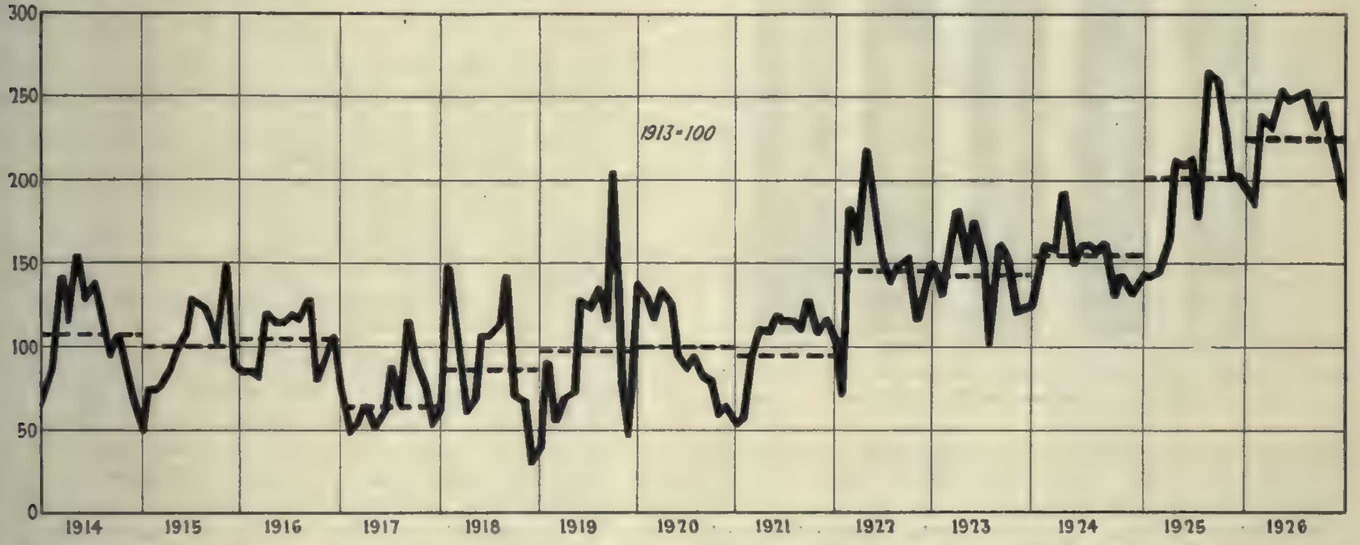
Table II—Partial Track Abandonments in 1926

	Miles of Track			
	Service Suspended	Abandoned	Removed	Type of Service
Connecticut				
Connecticut Co.	......	3.07	1.39	City
	......	7.62	5.91	Interurban
New York, New Haven & Hartford R.R.	......	......	.45	....
Massachusetts				
Berkshire Street Ry.	......	......	.57	Interurban
Boston Elevated Ry.	5.59	2.18	5.07	City
Boston & Worcester Street Ry.	6.00	......	......	Interurban
Eastern Massachusetts Street Ry.	......	15.54	......	Interurban
Lowell & Fitchburg Street Ry.	1.00	......	......	Interurban
Middlesex & Boston Street Ry.	......	20.19	3.90	Interurban
Plymouth & Brockton Street Ry.	......	......	6.00	Interurban
Springfield Street Ry.	17.43	......	2.28	Interurban
	.47	......	......	City
Union Street Ry.	......	......	.03	City
Worcester Consolidated Street Ry.	5.30	......	......	City
New Hampshire				
Keene Electric Ry.	10.00	......	9.00	City
Rhode Island				
Newport & Providence Ry.	1.50	......	......	City
United Electric Rys.	......	......	.45	City
	5.47	......	7.70	Interurban
District of Columbia				
Capital Traction Co.	......	......	.70	City
Washington Railway & Electric Co.	......	......	2.80	City
Maryland				
United Railways & Electric Co.	......	......	2.06	City
New Jersey				
Morris County Traction Co.	......	......	6.00	Interurban
New York				
Brooklyn-Manhattan Transit Corp.	......	......	.95	City
Buffalo & Erie Rys.	......	2.00	......	City
International Ry.	3.17	......	2.15	City
	14.37	13.52	8.55	Interurban
Jamestown Street Ry.	......	14.00	4.00	Interurban
New York & Stamford Ry.	......	.52	......	City
New York State Rys.	1.35	......	......	City
Olean, Bradford & Salamanca Ry.	5.00	......	9.00	Interurban
Poughkeepsie & Wappinger Falls Ry.	......	......	.38	City
United Traction Co.	5.99	......	3.22	City
Pennsylvania				
Bangor & Nazareth Transit Co.	11.00	......	......	Interurban
Bangor & Portland Transit Co.	......	7.00	......	Interurban
Citizens Traction Co.	2.85	......	......	City
	7.80	......	......	Interurban
Erie Rys.	......	.50	.20	City
Lehigh Valley Transit Co.	......	11.90	14.03	Interurban
Philadelphia Rys.	3.26	......	......	City
Philadelphia & West Chester Trac. Co.	......	1.60	......	Interurban
Pittsburgh Rys.	......	......	8.92	City
	......	......	.03	Interurban
Scranton Ry.	......	6.17	1.50	Interurban
Shamokin & Edgewood Electric Ry.	......	......	5.00	Interurban
United Traction Street Ry.	12.29	......	......	Interurban
Virginia				
Newport News & Hampton Railway, Gas & Electric Co.	......	......	.32	Interurban
Virginia Electric & Power Co.	......	2.52	......	City
Illinois				
Coal Belt Electric R.R.	......	3.50	......	Interurban
East St. Louis & Suburban Ry.	2.90	......	.06	City
Illinois Power & Light Corp.	13.37	......	......	City
North Kankakee Street Ry.	.34	......	......	City
Indiana				
Chicago, South Shore & South Bend R.R.	2.00	......	......	City
Indianapolis Street Ry.	.69	......	......	City
Terre Haute, Indianapolis & Eastern Traction Co.	......	......	.20	Interurban
Union Traction Co. of Indiana	3.44	......	3.33	City
Iowa				
Charles City Western Ry.	1.20	......	......	Interurban
Des Moines City Ry.	......	.60	......	City
Iowa Southern Utilities Co.:				
(Burlington)	......	2.00	......	City
(Centerville)	......	1.25	......	City
(Ottumwa)	......	4.50	......	City
Sioux City Service Co.	......	1.14	......	City
Tri-City Ry.	4.12	......	......	City
Kentucky				
Kentucky Utilities Co.	4.50	......	......	City
Louisville Ry.	......	......	.19	City
	.04	......	......	Interurban
Michigan				
City of Detroit—Dept. of St. Rys.	......	......	5.49	City
Detroit United Ry.	.82	......	......	City
Menominee & Marinette Light & Traction Co.	1.73	......	......	City
Michigan Electric Ry.	3.50	......	.68	Interurban
Missouri				
City Light & Traction Co.	1.75	......	......	City
Missouri Power & Light Co.	.09	......	......	City
St. Francois County R.R.	......	2.00	......	Interurban
United Rys.	.39	.68	......	City
	.42	.41	......	Interurban
Ohio				
Cincinnati Street Ry.	1.80	......	......	City
	......	8.20	......	Interurban
Cleveland Ry.	1.76	1.00	......	City
Cleveland Southwestern Ry. & Light Co.	......	10.30	......	Interurban
Columbus, Delaware & Marion Electric Co.	......	3.88	......	City
Columbus, Urbana & Western Electric Ry.	......	......	7.50	Interurban
Community Traction Co.	......	......	6.30	City
Ohio Public Service Co.	......	3.28	......	Interurban
Pennsylvania-Ohio Electric Co.	1.30	......	......	City
	......	17.00	......	Interurban
Southern Ohio Public Service Co.	8.78	......	......	City
Western Ohio Ry.	1.00	......	......	City
Wisconsin				
Madison Rys.	.75	......	......	City
Milwaukee Electric Railway & Light Co.	......	2.58	......	City
	.17	1.23	......	Interurban
Northern States Power Co.	......	......	8.07	Interurban
Wisconsin Power & Light Co.	1.20	......	.20	City
Wisconsin Public Service Corp.	2.89	2.00	......	City
Alabama				
Alabama Power Co.	......	......	.75	City
Birmingham Electric Co.	.15	.08	......	City
Mobile Light & Railroad Co.	......	......	1.30	City
Georgia				
Columbus Electric & Power Co.	......	......	2.45	City
Georgia Railway & Power Co.	......	......	1.12	City
Macon Railway & Light Co.	......	.40	......	City
Savannah Electric & Power Co.	......	......	1.16	City
Florida				
Jacksonville Traction Co.	......	......	.54	City
Key West Electric Co.	2.70	......	1.68	City
Louisiana				
New Orleans Public Service, Inc.	......	......	14.66	City
Mississippi				
Mississippi Power Co. Gulfport	......	......	22.50	Interurban
Mississippi Power & Light Co.	......	......	.60	City
North Carolina				
Durham Public Service Co.	1.83	......	......	City
Tidewater Power Co.	......	.40	......	Interurban
Arizona				
Phoenix Street Ry.	6.00	......	......	Interurban
California				
Key System Transit Co.	......	.12	......	City
Pacific Electric Ry.	......	......	8.80	City
	......	......	2.20	Interurban
Southern Pacific Co.	......	......	8.93	City
	......	......	1.13	Interurban
Union Traction Co. (Santa Cruz)	3.50	......	......	City
Colorado				
Colorado Springs & Interurban Ry.	......	2.53	......	City
Denver & Intermountain R.R.	......	......	.05	Interurban
Denver & South Platte Ry.	......	4.25	......	Interurban
Denver Tramway	4.33	......	......	City
Grand River Valley R.R.	3.00	......	......	City
Idaho				
Boise Valley Traction Co.	4.30	......	......	City
Nebraska				
Lincoln Traction Co.	.57	......	......	City
Omaha, Lincoln & Beatrice Ry.	.63	......	......	City
North Dakota				
Northern States Power Co.	1.00	......	......	City
Oklahoma				
Northeast Oklahoma Ry.	.19	......	......	Interurban
Oklahoma Rys.	......	......	.63	City
Oregon				
Portland Electric Power Co.	.54	......	......	City
Willamette Valley Southern Ry.		11.40	......	Interurban
New Orleans Public Service, Inc.	1.97	....	4.86	....
Shreveport Rys.	....	....	0.07	....
South New Orleans Light & Traction Co.	....	....	0.83	....
Mississippi				
Mississippi Power Co. Gulfport	....	....	2.25	....
Utah				
Utah Light & Traction Co.	......	.64	......	City
	......	......	8.74	Interurban
Washington				
Puget Sound Power & Light Co.	......	......	.98	City
Seattle Municipal Ry.	.91	......	......	City
Yakima Valley Transportation Co.	1.80	......	......	City
Canada				
Canadian National Rys.	......	......	7.53	Interurban
London Street Ry.	......	.60	......	City
Niagara, St. Catharines & Toronto Ry.	.09	......	......	Interurban
Porto Rico				
Ponce Electric Co.	1.11	1.10	......	City
Total	227.34	195.40	230.71	

Manufacturing Activity Should Continue at High Level

General Economic Conditions Give No Indication that a Material Recession Is to Be Anticipated in 1927—Manufacturers in Electric Railway Field Believe Transportation Industry Is Now in Position to Realize on Its Opportunities — They Give Outlook for Year

CONSERVATIVE optimism is the keynote of all prophecies for the year 1927. Few in industry generally anticipate many new records during the forthcoming twelve months. It is obvious that production cannot be expected to pyramid indefinitely at the rate established in 1925 and 1926. However, the general opinion seems to be that the present prosperity will be at least well sustained during this year.



General Construction Volume Was Maintained at a Record Level During the First Ten Months of 1926, Surpassing All Previous Years

Certain advocates of the cyclic theory hold that the current rate of production must soon slack off. Two years of unprecedented prosperity, with the second far exceeding the first in almost every respect, with the anomalous situation existing of heavy borrowing and low money rates, with a major disaster such as that which recently occurred in Florida, passed over without a downward flicker of the prosperity wave—these things, say the ultra-conservative believers in business cycles, are lulling us into a false sense of security. Awake! Prepare for a recession!

Admittedly certain elements of the economic setting should be given attention. Declines in building activity, in automobile production and in commodity prices, the effects of low cotton prices, the unfavorable agricultural conditions existing in certain sections of the country, the extremely high level of stock prices and of speculative activity might be pointed to as falling in this category. This is the darker side of the picture.

On the other side one takes cheer in the uniformly liquid condition of business generally, the growth of the hand-to-mouth purchasing movement, the high wage levels which have been maintained in the face of slightly declining prices, the minimum of unemployment, reflected in a widely spread purchasing power on the part of labor, the revival of foreign purchasing and the increasing attention which is being given by American manufacturers to the establishment of a sound foreign market which may be resorted to in case of a temporary recession in this country. In other words, a number of stabilizing factors have been developing which may be relied upon to act as effective checks to any abrupt downward movement.

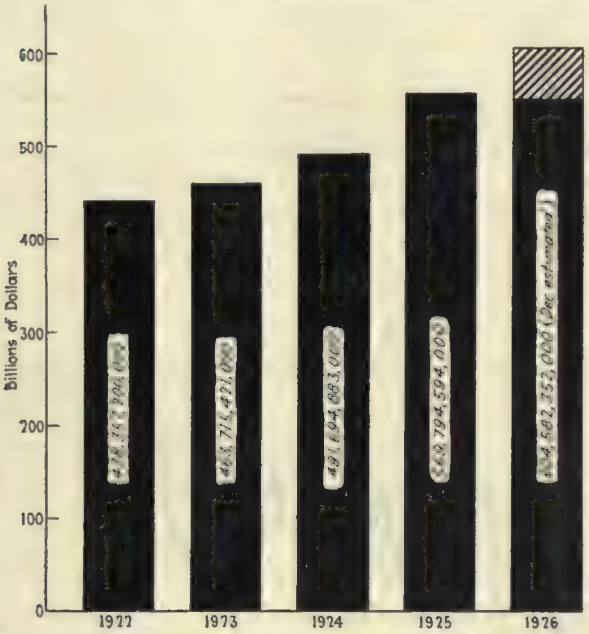
The year 1926 has been marked, industrially, by a great many highlights of surpassing interest. From the point of view of the electric railways and of the manufacturers catering to this field it has been a year largely of promise, partially of fulfillment. In practically every industrial community production has attained a high proportion of capacity, with corresponding large payrolls—a boon to the railways in increasing the demand for public transportation.

A certain retardation of general activity has been noted during the last two months of the year, but this may be attributed largely to the normal seasonal slowing down. It is perhaps more pronounced than that of a year ago, but will scarcely imperil the records which have been securely established during the first ten months, not only for high production but also for material savings which have been effected in the costs of manufacture.

Such basic industries as steel production and coal mining may generally be relied on to give a quite accurate indication of the status of industry as a whole.

In the past year steel production figures have maintained a high level throughout the summer months and at no time showed any very marked fluctuations. Although the past two months have evidenced a material reduction in ordering, the final figures for the year will undoubtedly establish a new all-time record for the industry.

Under the stimulus of the British coal strike bituminous production in this country responded as to a lash. In addition there has been a very strong domestic market which has filled in the chinks of the export trade and has vouchsafed a degree of stability to the coal industry which has been notably absent in the recent past. Production has practically reached capacity in many of the fields. Occasionally the warning is heard that labor difficulties may be expected in the spring, when the Jacksonville agreement terminates, but it is certain that every effort will be made to avert a major labor disturbance.



Bank Debits to Individual Accounts, as Reported by the Federal Reserve Bank, Indicate the Increasing Prosperity of the Country

Cumulative figures for coal exports during the first ten months of the year reveal a total of 26,321,924 tons, as against 16,152,657 tons in the corresponding period of 1925. Foreign demand accounts for only about half of the total production; the remainder must be credited to domestic consumption and to the building up of stocks in this country.

Prices have remained gratifyingly stable in most of the basic commodities. Standard steel rails have not fluctuated an iota during the past three years; copper has shown little tendency to fluctuate, while coal has undergone such gradual price movements, up during the late summer and fall months and now slightly downward once more, that consumers have suffered no embarrassment in determining when and in what quantities to purchase. Oil production has increased, partially in response to increased demand, partially because of the discovery of new oil deposits. Much oil is being pumped into storage, a guarantee that no very material advances in the prices of oil and its derivatives need be looked for in the immediate future.

Notable progress was made by the oil industry in increasing the amount of gasoline obtained from each barrel of crude, according to W. C. Teagle, president of the Standard Oil Company of New Jersey. The average gasoline yield this year was approximately 35 per cent, an increase of nearly 2½ per cent over 1925. This is mainly accounted for by the rapid spread of cracking processes.

One excellent criterion of the nation's prosperity is the yearly total of bank debits to individual accounts, as reported to the Federal Reserve Bank. Each year since 1921 this total has been rising. In 1925, particularly, it showed a noteworthy increase. While 1926 will scarcely show as large an increase over the preceding year as did 1925, there will nevertheless be a sizable increment, estimated conservatively at $34,000,000,000. Since the bank debits include not only bank clearings but also checks deposited in the banks on which they are drawn, the total is an accurate indicator of general business activity.

LOOKING TO THE FUTURE

It is interesting to note that both capital and labor share the same optimistic outlook upon the new year. Directors of the National Association of Manufacturers are inclined to this favorable view for a number of reasons, made public in statements issued during the past week. Among them were the following:

1. Business is nearer to a cash basis than it has ever been.
2. Financial panics are a thing of the past because the Federal Reserve Banking System stands as an indestructible buffer.
3. Industries are now operating at a high rate of production, yet one based upon a reasonable demand.
4. The margin of profits has been narrowed, bringing a truer relationship between costs and sales.
5. Competition will be stronger.
6. Credits have decreased and there is ample money at reasonable rates.
7. People generally are contented and there are gradually fewer labor disturbances.

John E. Edgerton, president of the National Association of Manufacturers, stated that 99 per cent of the association's membership is planning for better business in 1927 than was enjoyed in the year just past. He said that 75 per cent recorded better business in 1926 than in 1925; 68 per cent have increased their forces and 89 per cent are paying higher wages now than they were a year ago.

William Green, president of the American Federation of Labor, in a statement prepared for publication in the January issue of the *American Federationist*, said:

> The conditions are strongly indicative that 1927 will be as good a year as 1926 if not better. Many industries have established production policies and methods calculated to sustain prosperity. Our trade union movement has made a substantial contribution toward making ours a high wage country and demonstrating that high wages are compatible with low unit costs. Our resistance to wage reduction has held a definite influence in shaping industrial policies. Because wages are high we can do our part in buying the articles industries are turning out in ever-increasing quantities.

1926 AND 1927 SEEN THROUGH THE EYES OF ELECTRIC RAILWAY MANUFACTURERS

Feeling that the manufacturers whose activities bring them in direct contact with the electric railway industry would have opinions of particular interest in this consideration of the possibilities of the coming year, a representative group were asked by ELECTRIC RAILWAY

JOURNAL to state their ideas along this line. Their comments on the past year and any suggestions concerning probable new developments to be announced in 1927 were also requested.

It will be seen from the opinions next appended that the car builders are not hesitant in expressing their belief that 1927 will witness a widespread activity in the modernization of rolling stock. The intensive campaigns which have been waged to stimulate this desired movement are looked upon as having thoroughly prepared the ground for the sale of much-needed cars.

The J. G. Brill Company

It has been our experience that while car buying during the year just passed shows some improvement over that of its predecessor, it is apparent that purchases of new rolling stock have been far below the industry's requirements during these two years.

I am inclined to believe, however, that the year 1927 will be one of increased activity to a degree which will better reflect the optimism with which the electric railway industry is now moving forward.

Deferred replacements, as well as a more definite understanding of the parts which both the electric car and the bus shall play in public transportation and a general recognition of the economic advantages of modern, light-weight cars, are factors which should stimulate car purchases during the coming year. SAMUEL M. CURWEN, President.

The Cincinnati Car Company

The year 1926 was one of arrested progress in the street railway industry. The bus, which appeared on city streets during the two previous years, offered, particularly while new, an attractive looking and rapid means of transportation, and street railway officials generally were inclined to give this new passenger car a fair chance to demonstrate its usefulness before adopting or condemning it as a substitute for the electric street car. We believe that during the year 1926 these officials became satisfied that there is not only a "passenger preference" for the new street car, which is both comfortable and safe, but that the street car is cheaper to operate, more profitable as an investment, and the only vehicle that can move the masses during the rush hours.

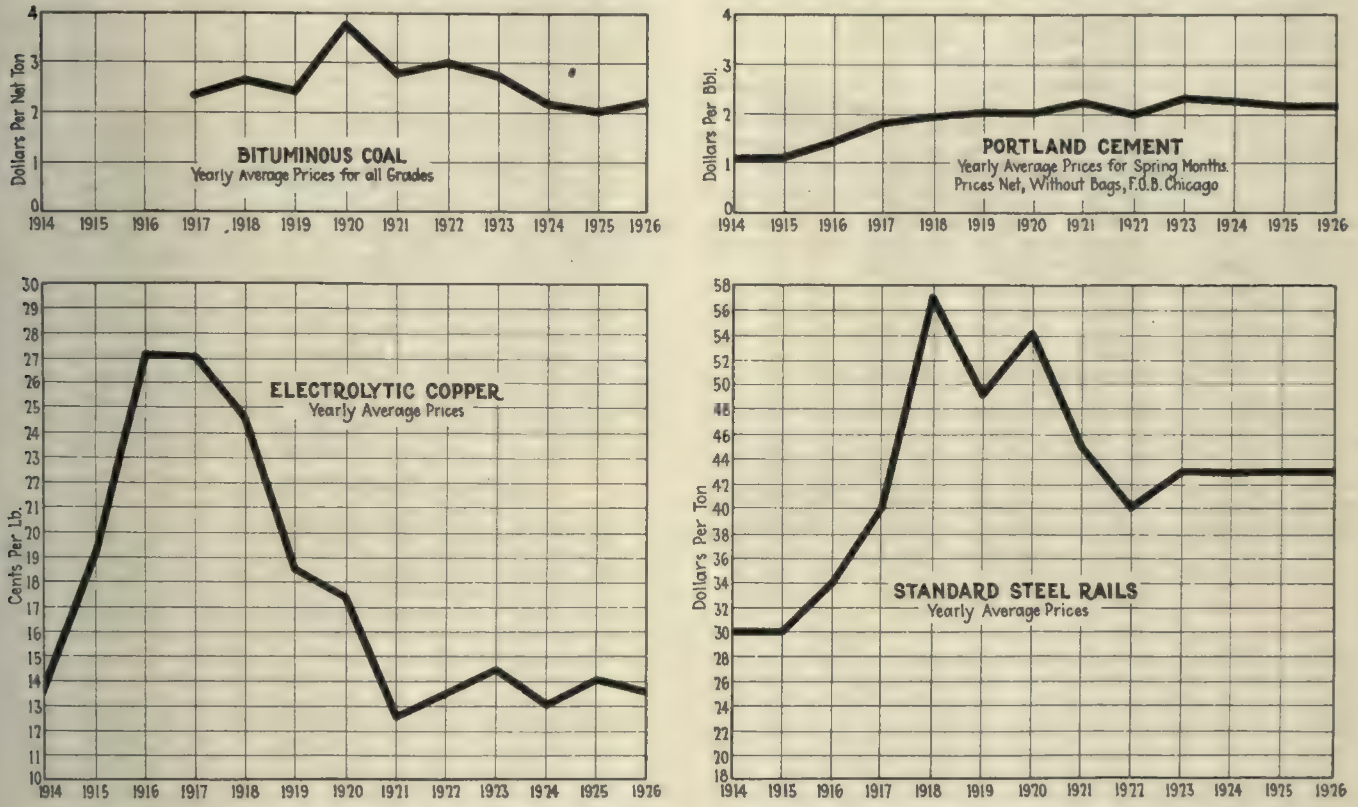
A year ago few street railway companies were even considering the purchase of new cars for city operation, whereas today there are numerous inquiries for new cars of light weight, attractive appearance and economical design. We believe that the buses heretofore purchased by street railways will be used as feeders, but that existing car lines will be kept in operation and extended. We, therefore, expect the year 1927 to be one of increased activity on the part of street railway operators, as well as manufacturers of cars and equipment.

H. L. SANDERS, Vice-President.

Light Weight Noiseless Electric Street Car Company

We feel that the past year has produced considerable valuable information supporting our belief and prophecy as to the value of new, attractive rolling stock, and we believe that a great deal has been accomplished in getting the electric railway industry to appreciate this fact.

E. M. MADDOX, Vice-President.



Four Basic Industries Maintain Fairly Constant Price Levels in Spite of Heavy Production

Electrical equipment manufacturers concur in the belief that the present year will equal, and probably surpass, the total of sales made during 1926. Further developments to be made in both car and gas electric bus equipment are indicated.

Westinghouse Electric & Manufacturing Company

The year 1926 marks the turning point of the electric railway industry. Orders for railway equipment booked during the past year show, in rough figures, a 25 to 30 per cent increase over the low ebb of 1925. While this, of itself, does not mean very much, it does show a definite trend upward and, when coupled with other factors, it justifies the conviction that the coming year will be marked by very definite strides toward the re-establishment of the electric railway industry and one of our sound and prosperous public utility enterprises.

Last year was marked by a crystallization of judgment by a majority of opinion as to the place of the bus and the future of the electric railway. Railway men now possess real knowledge of bus operation, its best field of service, and also its costs and limitations. They also possess knowledge of what may be accomplished by the rehabilitation of street car service.

The manufacturers have confidence in the future of the basic service of the street car for mass transportation.

Our company, for example, has expended larger amounts for engineering developments during the past three years than we did in many former years. These improvements of street car equipment introduced such things as dual ventilation, oil sealed housings, better ventilator windings, numerous improvements in controller apparatus, resistance grids and experiments with spring-borne motor equipment.

It is our conviction that the number of street cars and electrical equipments sold in 1927 will exceed the total of 1926 by from 30 to 50 per cent. MYLES B. LAMBERT,
Transportation Sales Manager.

General Electric Company

A survey of the year just ended indicates a somewhat reduced volume of business in railway motor car equipment as compared with the year 1925. There have been some sales of such equipment for new extensions to existing street railways, and substantial sales of gas-electric bus equipment. If we consider the sales of gas-electric buses to electric railways, the total purchases indicate an approximately normal business, as compared with similar business during the past several years.

A very effective campaign has been instituted by the American Electric Railway Association, particularly on replacement of obsolete cars and electrical equipment, and we feel that the effects of this campaign will be reflected by an increase in car equipment business next year.

One of the outstanding features of the electric railway industry is the application of electric drive for bus transportation. It is expected that during 1927 this class of equipment will be used even more extensively.

We believe that the electrical business as a whole for the year 1927 will be equal to or greater than that for the year 1926. J. G. BARRY, Vice-President.

Westinghouse Air Brake Company

We can see no sign of any abnormal decline in business activities in the near future. We do not believe that new car orders from both steam and electric railways will decrease in 1927 as compared with 1926. Accordingly we see no reason why we should not look forward to the coming year with confidence for continued activity and prosperity.
J. A. RALSTON, Chief of Publicity.

Ohio Brass Company

The one disappointing feature of the business of our company during 1926 has been the lack of rally of the electric railway industry to the campaign and necessity for new cars. This industry holds a proportion of our interest quite out of balance with the proportion of revenue it brings to the company in comparison with the central station, mining and steam railroad fields. Doubtless, then, we are supersensitive to any evidence that this industry is not continuing to improve its position.

Apparently the year 1926, with respect to new car purchases, has been on nearly the same plane as 1925, which was the lowest in the history of the industry so far as records are available, except for 1921. This condition prevails despite the fact that some very good work has been done in the last few years, and particularly in the last year, to impress on the industry the paramount need for modernization. But it would seem that a much more effective effort must be devised to bring home to the industry the necessity for modernization, and how to accomplish it.

Successful transportation today is a matter of selling that service. But the first fundamental of selling anything is to have a product that is right in the eyes of the buyers. While track and other plant must be in good condition, to a very large extent, this matter simmers down to the cars themselves. They are the show windows of the company.

Aside from the economies that can be effected with modern equipment, there is the important consideration of developing increased riding, or, perhaps, of holding the present rate. For certainly there is nothing that impresses the public more with the feeling that the street railway is an out-of-date means of transportation and is on its way out of existence than the old cars that still navigate the streets of many cities.

As to finances, new cars will virtually finance themselves out of improved net earnings. But such improvements would be much more readily available if more companies would face squarely the necessity to go to their bondholders and sell them the necessity for accepting a much reduced face value of bonds, with preferred stock in lieu of the difference. This places a company in position, by virtue of having a smaller amount of its annual obligations in fixed charges, to improve its financial situation year by year.

It would seem that unless something is soon accomplished along the lines of financial reorganization and modernization, the industry is in danger of losing the hard-won ground it has gained in the last ten years in improved public relations and a better deal at the hands of public authorities. We cannot go on indefinitely with the old methods and old equipment. The public must have some evidence that it is getting a return for its increased investment in car rides. H. L. BROWN, Secretary.

International Steel Tie Company

The increasing optimism of the past few years, definitely crystallized in 1925 and 1926 by the discovery that new equipment more than paid its way and that the rubber-tired vehicle had its niche, has put an altogether new front on the electric railway store. We have felt this change of front very definitely in this past season's business in the reception which more permanent and ultimately renewable track construction has received from the industry.

For example, a 317-mile Middle Western property, in a complete rehabilitation of its financial and physical structure, has just completed 8 miles of twin tie track in eight weeks' time. The year 1927 promises to consolidate these confidences into a steady growth by adoption of the best in equipment, power generation, track and operating ability.
T. J. LAVAN, General Manager.

I have found in the past year a very decided tendency on the part of street railway operators to build for permanency rather than the hand-to-mouth idea of buying so prevalent a few years past. The outlook for next year seems even more optimistic and, personally, I can see more definite business in sight than in any previous year at this time. FRED H. OGDEN, Sales Manager.

Railway Track-Work Company

Our business with the electric railway industry during the present year compares favorably with that in other years. For the coming year we look for normal business, but we have no reason to believe it will be any improvement as compared with the present year, as there have been no new developments which in our opinion would make for better business conditions. W. B. GOODALL,
Secretary and Treasurer.

Manufacturers of buses and bus equipment seem convinced that automotive equipment will take an even greater place in co-ordinated transportation during 1927. Inquiries for city and interurban units are active.

International Motor Company

The principal objective in 1926 of Mack Trucks, Inc., was the placing of the credit part of its business on a sound basis. This has been accomplished. We are hopeful other manufacturers will follow. If so, financially sound and established operators will find it possible to stabilize the business of selling co-ordinated transportation.

The year 1926 in the bus business saw a large increase in buses operated by public utilities and a better appreciation of their use in the street railway field. Even companies using them originally for defensive measures have found them a useful and profitable tool in transportation.

Our confidence in the prospects for 1927 is shown by the fact that, in addition to our standard line of four-cylinder Mack buses, we have added a six-cylinder and both a four-cylinder and six-cylinder gas-electric. Plant facilities have been increased anticipating the greater demand.
A. J. BROSSEAU, President.

Yellow Manufacturing Sales Corporation

Our orders booked during 1926 will show a 60 to 70 per cent increase over 1925, and I think our actual deliveries will run pretty close to 100 per cent over 1925.

There has been a slight let-down in sales during the fall months, but I think this is only temporary and I look forward to an unusually good volume of business in 1927. This information is based on our consolidated prospect list, which we compile weekly and which indicates the trend of the industry throughout the country.

I believe I am conservative when I say that we ought to have a 50 per cent increase in sales for the year 1927.

H. E. LISTMAN,
Vice-President Directing Motor Coach Sales.

American Car & Foundry Motors Company

Anything I may say in an effort to forecast the outlook for 1927 with respect to the possible expansion of automotive operations by the traction lines will of course be nothing better than a guess. There are some indications of the fact that the traction companies are realizing the economies, under certain operating conditions, of using automotive equipment in place of, or as an adjunct to, rail equipment, and many of them are laying plans for the introduction of such service.

Business pending now seems to be materially in excess of the same period last year, and because of this we regard the outlook for 1927 from the standpoint of the electric railways as promising.

CARL ABELL,
Advertising Manager.

Haskelite Manufacturing Corporation

The past year has been the first year that this company has began to reap the benefits of its pioneering efforts to make its products Haskelite and Plymetl standard in the street railway field. Thirty-three companies which bought upward of 550 cars during 1926 specified Haskelite, Plymetl or both in some part of the body equipment. This does not take into consideration the numerous companies which purchased these materials for remodeling work as a substitute for products used when their cars were built. Our sales record shows a 98 per cent increase in the sale of our street car material direct to street railway companies during the past year over 1925.

JAMES R. FITZPATRICK, Secretary.

Ohmer Fare Register Company

We are just closing the best business year in our history. Our product functions with the most important factor in the transportation field, the protection and conservation of revenue. In these days of keen competition the difference between cost and selling price is what counts.

People are prone to take the line of least resistance. The popularity of the electric car is reflected by increased passengers everywhere. The electric car is generally conceded to be the best, safest and most reliable means of transportation. Nothing can compete with it for transporting large numbers of people. Additional rolling stock will be required and means for protecting the revenue are essential, for which reason we are optimistic.

I do not subscribe to the proposition that buses will be to any extent substituted for electric cars. Buses have their place and they will eventually prove to be good feeders to the electric lines, but in my opinion buses can never take the place of cars.

It is conceded generally that business will be good, at least for the first six months of 1927, but it should not be forgotten that we have established an unusual precedent which will be difficult to maintain to the satisfaction of all.

JOHN F. OHMER, President.

The Texas Company

During the present year the Texas Company has been very successful with regard to business relations with the electric street railway industry. We have had full cooperation from the American Electric Railway Association, and from all with whom we have been privileged to transact business. In fact, our relations have been very pleasant and all that could be expected. We contemplate an enlargement of business and a full year of the same pleasant relationship as that enjoyed in the past.

G. R. ROWLAND, Superintendent Lubricating Sales.

Electric Railway Equipment Company

Our railway and lighting equipment business for 1926 shows approximately 30 per cent increase over the previous year. From present indications we see no decline for the first quarter of next year. The present activity seems to be general and is not confined to any particular section.

Lang Body Company

The first half of 1926 was very good, but a slowing down became apparent in August and has continued to date. If half of the projects now under way for expansion of bus transportation should be carried out 1927 should be a very busy year for all who are engaged in manufacturing bus equipment.

E. J. LANG,
Vice-President and Treasurer.

Goodyear Tire & Rubber Company

It is our judgment that the advent and general acceptance of balloon tires for bus and truck use during the past year marked an important advance in the development of the transportation field. This development should be of even greater value to operators during 1927, bringing increased operating mileage and better patron satisfaction.

R. PRESTON, Bus Transportation Sales.

Nichols-Lintern Company

Last year was disappointing in the demand for car equipment. On the other hand, the demand for bus equipment by electric railways was even greater than had been anticipated. With full confidence in the industry we are now developing new equipment to go on the market early in the year. Most of these developments will be in the field of motor vehicle appliances. Our contacts, however, indicate to us a greater purchasing of car equipment and a lesser demand for bus equipment from electric railways for 1927.

WILLIAM LINTERN, President.

Heywood-Wakefield Company

At the rate we have been receiving inquiries from the electric railways it looks as though the coming year would be a very good one. There seems to be a real interest on the part of the railways to use more comfortable seating equipment and we are getting orders from the various railways for a type of seat far more comfortable than has ever been used.

We have even had inquiries for seats for one-man cars where the roads want to give their passengers a deep spring cushion seat in place of the hardwood seat formerly used.

G. E. CORNWALL, Assistant Manager.

The Baker-Raulang Company

The year 1926, viewed as a whole, indicates quite a decided step has been taken during that period toward standardizing on body types, sizes and equipments. With this experience as a background, we will enter the year 1927 with a more complete line of standard bodies for all types of service usually supplied by electric railway companies.

We anticipate the coming year will see a material further application of buses by electric railway interests.

E. J. STAHL, Vice-President.

Timken Roller Bearing Company

We have had the biggest business we have ever had during 1926 and we expect from all indications that this will increase during 1927. Our business of supplying bearings for gas rail cars is growing all the time and we are in a position now where our bearings are used on practically all types of this car made. During the past year several large companies have begun to install Timken tapered roller bearings on electric rail cars. In addition, for 1927 we foresee a great amount of business for our bearings in the steam railroad field as indicated by our entry into that field with an order for the bearings for 127 cars for the Chicago, Milwaukee & St. Paul Railroad.

R. P. KELLEY, Advertising Manager.

Gold Car Heating & Lighting Company

Looking back over the passing year, we may readily observe the definite advance made by the electric lines in conforming to a higher standard for their equipment and giving the public the benefit of recent improvements and inventions. In the heating end, more care is used to give sufficient and better distributed heat in better built cars.

We expect this development to continue during the coming year, and to increase. The public demands comfort and the railways are giving it to them.

E. B. WILSON,
Vice-President and General Manager.

The Readers' Forum

Mr. Ritchie Presents Bus Viewpoint

CHICAGO MOTOR COACH COMPANY

CHICAGO, ILL., Dec. 28, 1926.

To the Editor:

G. A. Richardson, vice-president and general manager Chicago Surface Lines, has been quoted at great length in ELECTRIC RAILWAY JOURNAL and other technical and lay papers concerning the proposition made by the Chicago Motor Coach Company to provide a city-wide system of motor coach transportation to serve all the people now served by the Surface Lines. Not all of what Mr. Richardson said has been included in the report in ELECTRIC RAILWAY JOURNAL of Dec. 18, pages 1105 to 1108, inclusive.

In the interest of accurate information for the public and, particularly, the street railway industry, it is felt that certain of Mr. Richardson's statements, obviously based upon misinformation, should be corrected. This may be done, perhaps, most briefly in the following form:

Mr. Richardson: "The bus company claims it can do the work of Chicago's 3,539 street cars with 4,685 buses. It would be impossible. The load is too high. It would take at least 6,500 buses at the minimum."

Answer: Mr. Richardson gives no data for his statement. Our estimate, carefully made, should be accorded more weight than his unsupported generality, which could be interpreted as saying that the job could be done with enough coaches.

Mr. Richardson: "If buses are to give city-wide service, certain things would have to be cared for—Greater frequency of service, service at all hours, greatly increased ratio of rush-hour service, reasonable headroom, pneumatic tires, air brakes, heating and ventilating, taxes and charges for paving."

Answer: Every requirement in the list has been provided for definitely, except that of pneumatic tires. When pneumatic tires are feasible, safe and dependable, the Chicago Motor Coach Company will use them.

Mr. Richardson: "The bus lines have had the cream of the traffic. They have not had to take the lean with the fat, as do the street cars."

Answer: The Chicago Motor Coach Company operated in 1925, its most profitable year, 29 motor coach routes. Of these thirteen lost money, in the sum of $229,226.43. *This is taking the lean with the fat.* In the vital traffic factors, average length of ride, diversification of business, load factor, two-way riding, and volume of business, it is the Surface Lines which have had the fat.

Mr. Richardson: "The claim that the buses would take up 22 per cent less street space than the street cars is nonsense."

Answer: This is to assert that simple arithmetic is nonsense. The figures in the following table are for the street cars owned by the Surface Lines, and for the motor coaches proposed for the new city-wide system. The relative total area occupied by street cars and motor coaches will be as follows:

Total area covered by 3,539 street cars	1,443,912 sq.ft.
Total area covered by 4,685 motor coaches	1,124,400 sq.ft.
Saving in street area by use of motor coaches	319,512 sq.ft. or 22 per cent.

Mr. Richardson pursues this line by declaring that "during the rush hour period we (Surface Lines) handle 80,000 passengers an hour in the Loop with 900 street cars. They would need 1,340 buses."

Answer: Taking Mr. Richardson's own figures (which we definitely declare as to coaches needed are incorrect) the comparison as to space occupied would be as follows:

900 street cars (48 ft. x 8½ ft.)	367,200 sq.ft.
1,340 coaches (30 x 8 ft.)	321,600 sq.ft.
Saving in area by use of coaches	45,600 sq.ft.

Mr. Richardson: "The Fifth Avenue Coach Company in New York has been able to justify using only 300 buses in the largest city in the country."

Answer: The Fifth Avenue Coach Company, in the calendar year of 1925, operated a fleet of 440 motor coaches and carried 70,654,704 revenue passengers, an increase over the year before of 9,197,584 passengers, or 13 per cent. In the year ended June 30, 1925, the street cars in Manhattan carried 161,956,000 fewer passengers than they did in 1915.

Mr. Richardson: "When the novelty wears off the public comes back to the street car."

Answer: The Fifth Avenue Coach Company in New York, which has operated gasoline motor coaches for nineteen years, carried, in the fiscal year of 1915, 14,570,000 revenue and transfer passengers. In the year ended June 30, 1925, it carried 68,426,000 passengers in Manhattan only, an increase of 370 per cent.

In Newark, N. J. (nearly 500,000 population), the street cars are carrying about two-thirds of the passengers where formerly they carried them all.

Mr. Richardson: "Last year during the Eucharistic Congress buses dropped off in number of passengers carried. This was the time of need in mass transportation."

Answers: In the week of the Eucharistic Congress the Chicago Motor Coach Company carried 1,728,258 revenue passengers, or 142,613 (9 per cent) more revenue passengers than the best week of its history. In one day there were carried 320,000 revenue passengers, or 39 per cent more than on any day in 1926.

It is believed that the proposed system can be operated at a higher scheduled speed than that of the present Surface Lines. Our checks indicate a superiority of from 5 to 8 per cent, depending upon conditions.

J. A. RITCHIE,
President Chicago Motor Coach Company.

EDITOR'S NOTE.—An extended report of the proposal to substitute buses for street cars in Chicago was printed in ELECTRIC RAILWAY JOURNAL of Dec. 18, pages 1105 to 1108 inclusive. The letter which Mr. Ritchie wrote to the City Council was printed in full. A report of the statement which Mr. Richardson released to the Chicago press was also given, together with the general developments in the situation there and abstracts of Mr. Ritchie's reply and testimony at the hearing before the Council. On page 3 of this issue there is an editorial expressing the JOURNAL'S views on the moves being made in New York and Chicago. The above letter was received just in time to be included in this issue. The JOURNAL disagrees frankly with Mr. Ritchie in the above comparison of actual street space occupied by double-deck buses and single-deck cars as a measure of their ability to move heavy passenger loads or of their relative obstruction to other traffic when operating in the streets. It is, however, glad to publish his views in its effort adequately to present both sides of this situation.

Association News & Discussions

Standardization of Plain and Lock Washers

STANDARDIZATION of plain and lock washers was discussed at the meeting of the sectional committee of the American Engineering Standards Committee on that subject held at the United Engineering Societies building, New York, Dec. 8, 1926. A report was submitted by J. Howard Horn, for the manufacturers' committee, which gave proposed standard dimensions for lock washers. After discussion of this report, it was decided that the specifications incorporated should be approved with the omission of tables of dimensions for light and heavy washers.

Various phases of the work necessary in standardizing plain washers were taken up and Charles R. Dowdy of the Wrought Washers Manufacturing Company was appointed to draw up a specification with tables of plain washers which is to be considered by the committee.

C.E.R.A. Announces Program for Annual Meeting

SUCCESS of the annual meeting of the Central Electric Railway Association to be held at Toledo on Feb. 3 and 4 should be assured by the program which has just been announced. New cars, buses, maintenance, safety and financing are the principal electric railway subjects. The program follows:

THURSDAY, FEB. 3, BEGINNING AT 10 A.M.

Welcome by Mayor Fred J. Mery.

Address of President G. K. Jeffries.

"The Permanency of Increased Revenue Resulting from New Cars," a series of five-minute talks by George MacLeod, Fredonia, N. Y.; F. D. Norveil, Anderson, Ind.; W. R. Power, Huntington, W. Va.; L. M. Brown, Indianapolis, Ind.; R. N. Graham, Youngstown, Ohio.

"Twelve Thousand New Cars Paid For Annually but Not Received," by Charles Gordon, New York City.

"Street Cars and the Next A.E.R.A. Convention," by J. H. Alexander, Cleveland, Ohio.

Discussion by Myles B. Lambert, New York City.

AFTERNOON SESSION, BEGINNING AT 2 P.M.

"The Proper Use of Buses by Electric Railways," by Walter Jackson, Mount Vernon, N. Y.

Special conference of operating executives—Subject, "More Profitable Business for the Interurbans," led by J. P. Barnes, Louisville, Ky.

ANNUAL DINNER, 6:45 P.M.

Address by W. H. Sawyer, president American Electric Railway Association.

"The Airplane in Commercial Service Today," by W. P. McCracken, Jr., Washington, D. C.

"The National Defense," by Brigadier-General D. E. Aultman.

FRIDAY, FEB. 4, BEGINNING AT 9:30 A.M.

"What Price Better Maintenance."—"Results to Be Expected from Higher Standards of Maintenance," by H. S. Williams, Detroit, Mich.

"Car Maintenance on a Production Basis," by W. T. Rossell, Pittsburgh, Pa.

"Progress Under the Hoover Safety Conference Recommendations," by Ernest Greenwood, Washington, D. C.

"Results of Reshaping the Financial Structure," by R. M. Feustel, Fort Wayne, Ind.

Election of officers.

COMING MEETINGS OF *Electric Railway and Allied Associations*

Jan. 6-7—**Midwest Electric Railway Association, midwinter meeting, Mayo Hotel, Tulsa, Okla.**

Jan. 7—**American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p.m.**

Jan. 10-14—**American Road Builders' Association, convention and road show, Coliseum, Chicago, Ill.**

Feb. 18-19—**Kentucky Association of Public Utilities, annual convention, Brown Hotel, Louisville, Ky.**

Jan. 19-20—**Central Electric Traffic Association, Fort Wayne, Ind.**

Jan. 21-22—**Central Electric Railway Accountants' Association, Fort Wayne, Ind.**

Jan. 25—**New York Electric Railway Association, winter meeting. Hotel Commodore, New York City.**

Jan. *26-28*—**Association of Equipment Men — Southern Properties, Memphis, Tenn.**

Feb. 3-4—**Central Electric Railway Association, winter meeting, Toledo, O., Commodore Perry Hotel.**

Feb. 7-10—**American Institute of Electrical Engineers, annual convention, Engineering Societies Building, New York City.**

Feb. 10—**Central Electric Railway Master Mechanics' Association, Toledo, Ohio.**

April 26-29—**Southwestern Public Service Association, convention, New Orleans, La.**

Oct. 3-7, 1927—**American Electric Railway Association, annual convention, Public Auditorium, Cleveland, Ohio.**

Modernizing the Electric Railway Topic of Midwest Meeting

MODERNIZATION will be the theme of the meeting of the Midwest Electric Railway Association, to be held in Tulsa, Okla., on Jan. 6 and 7.

Thursday morning's session will open with a paper by D. W. Snyder, Jr., vice-president Illinois Traction Company, his topic being "Public Relations." This will be followed by a paper by E. F. McKay, manager Oklahoma Utilities Association, whose subject will be "Public Relations."

At the afternoon session papers will be presented by R. M. Graham, manager railway division Pennsylvania Ohio Electric Company, Youngstown, on the subject "Present-Day Town and City Transportation," and Charles Gordon, editor of ELECTRIC RAILWAY JOURNAL, New York, on the subject "Can the Electric Railway Industry Afford New Equipment."

The banquet will be given at 6:30 p.m. The principal speaker will be J. F. Owens, vice-president and general manager Oklahoma Gas & Electric Company.

At the Friday morning session W. H. Sawyer, president American Electric Railway Association, will address the meeting. After Mr. Sawyer's speech there will be a business session. The afternoon will be given over to entertainment.

Southwestern Public Service Association 1927 Convention

NEW ORLEANS, LA., has been chosen as the meeting place of the 1927 convention of the Southwestern Public Service Association, to be held jointly with the Southwestern geographic division of the National Electric Light Association, April 26-29.

New York Electric Railway Association Midwinter Meeting

MEMBERS of the New York Electric Railway Association will get together for their midwinter meeting at the Commodore Hotel, New York City, on Jan. 25, 1927.

A very interesting program of subjects for discussion is being prepared.

It is requested that reservations for the dinner be mailed in to W. F. Stanton, secretary of the association, 267 State Street, Rochester, N. Y.

A.S.C.E. to Meet

ON JAN. 19-21, the American Society of Civil Engineers will hold its 74th annual meeting at the Engineering Societies Building, 33 West 39th Street, New York City. A number of papers on city planning and traffic control will be presented.

The News of the Industry

Municipal Ownership Bugaboo Reappears in Chicago

Use of the city's $45,000,000 traction fund for the purchase of the Chicago Surface Lines after the expiration of their franchises on Jan. 31, 1927, on a plan similar to that brought forward by the Lisman banking interests of New York, or on any other plan feasible under the city's bonding limitations, was suggested in a resolution submitted on Dec. 22 to the City Council by Alderman Patrick F. Ryan. The resolution directs the committee on local transportation, together with the Corporation Counsel and the committee's engineers, to give immediate consideration to the proposal.

In outlining his plan for municipal ownership, Alderman Ryan pointed out that, with the present franchises expiring in less than five weeks and with the failure of negotiations so far between the city and the companies, the traction question has again become "the subject of so much political propaganda that the condition of the public's mind on the subject is so confused that it is doubtful if any settlement with private ownership will be approved."

"We have completely failed, so far, in negotiating with the private companies," the Alderman declared. "And I believe we are bound to be fooled if we continue. The only way to protect the straphanger is to take over the lines ourselves."

The Lisman interests and the present surface lines managements, Alderman Ryan charged, are all co-operating in "one huge financial manipulation to gain control of the traction fund." He charged that the receivership move and the plan advanced by Mr. Lisman were prompted by mercenary motives.

Under the Lisman plan, extensions and improvements would be financed with $50,000,000 out of the city's traction fund, the Alderman pointed out.

If the properties can be obtained under the Lisman plan for $50,000,000, he insisted, it should also be possible for the city to acquire the properties under a similar plan.

John M. Harlan, who represents the Lisman interests in negotiations with the city, emphatically denied that the plan contained any "joker" such as refered to by Alderman McKinley. He said:

> Section 44 of our proposed ordinance, as it was read by Alderman McKinley provides that the city may purchase the new company's entire system on six months' notice by paying in cash the principal amount of the company's outstanding securities, representing capital investment, with interest to the date of purchase.
>
> Section 44 goes on to say: "In addition thereto an amount equal to the then present value of the grantee company's share of the compensation fixed and provided in section blank, to be divided between the city and the grantee company for the then remainder of the period of the grantee company's then existing permit to operate—such then present value of the grantee's company said share to be computed on the basis of an annual increase of $25,000,000 revenue passengers and an annual simple interest discount of 5 per cent for the then present payment of compensation not yet then earned."
>
> It will be seen that the additional amount the grantee company would receive by way of compensation in the event of purchase by the city would be vastly less than indicated in stories concerning that alleged "joker." And instead of being fixed and stationary—as under the 1907 ordinances—20 per cent of the capital account—would never be so large. In fact, it would grow less and less.

$2,000,000 Outlay by South Shore

Steps in advance in rehabilitation and new equipment of the Chicago, South Shore & South Bend Railroad during the past year mark it as the most important twelve-month period since the beginning of operation twenty-five years ago. More than $3,000,000 was spent in this work during 1926, in addition to the $750,000 spent in the last half of 1925, after the road had been purchased at foreclosure by Samuel Insull and associates of Chicago.

This improvement program is to be continued through 1927 and expenditures for new cars, construction and other extensions of facilities now tentatively planned call for an expenditure of approximately $2,000,000 during the coming year.

Among the improvements completed during 1926 are:

The purchase and placing in service of 25 new steel motor passenger cars.

Entire re-electrification of the railroad, including a change-over from alternating to 1,500-volt direct current, the construction of eight new electric substations, four of which are mercury arc rectifiers, and the rebuilding of the electrical overhead system.

Reballasting and laying of new 100-lb. rails between Kensington, Ill., and the Illinois-Indiana state line.

Reballasting and improvement of grades over the entire right-of-way.

Purchase of four new Westinghouse freight locomotives and general improvements in freight service, including extended sidings and team tracks.

Remodeling passenger stations at South Bend, Michigan City, Tremont, Gary and Hammond.

Several of these steps in the rehabilitation program led directly to the most important forward step taken during the year—the placing in service on August 29 of the new steel cars and through operation electrically between South Bend and Randolph Street, downtown, Chicago.

Among the new features which will be added to the company's service early in 1927 are two dining and two parlor observation cars. They are rapidly nearing completion at the works of the Pullman Car & Manufacturing Corporation in Chicago.

Law Forbids General Tax to Aid Seattle Railway

One of the various plans offered to solve the Seattle Municipal Railway's financial crisis, which has agitated the City Council of Seattle, Wash., for the past few months, was rejected recently when Corporation Counsel T. J. L. Kennedy rendered an opinion in which he held that the proposal to levy a general tax to aid in paying the bonded debt of the railway would be in violation of the state Constitution. Councilman E. L. Blaine had asked Mr. Kennedy to prepare for introduction in the next Legislature an act enabling the Council to levy a tax up to 2 mills, but this plan will undoubtedly be abandoned with the present ruling.

This leaves among the plans considered for solution of the problem two proposals—floating of a general bond issue to assist in paying off the debt. or issuing of refunding bonds, which would be railway revenue utility bonds, to retire the present bonded indebtedness, and then pay off the refund issue over a longer period than the present bond contract. For the first plan, a vote of the people would be necessary. For the second, the problem would be in finding a buyer for the refunding bonds.

In the meantime, the City Council is faced with the problem of meeting the railway department's payroll until Feb. 1, when the payment for 1927 on the purchase debt must be in the hands of the city's fiscal agent in New York. Refusal by the City Council, represented by a committee of its members, to consent to certain legislation demanded by City Treasurer E. L. Terry and Comptroller Harry W. Carroll to protect them from liability if the city fails on Feb. 1 to have on hand funds sufficient to take care of its bond obligation, these two officials have announced that the railway is immediately on warrant basis and no payrolls will be cashed. Warrants issued on the payrolls Dec. 24, Jan. 10 and Jan. 15 will be marked "not paid for want of funds," and to date no plan has been devised to meet the situation. The banks of the city have refused to cash them, and Mayor Bertha K. Landes states that she does not contemplate any further loans to the railway department from any other city departments.

In the meantime, the city is also facing the probability of having to repeal the ordinance passed on Dec. 20 increasing the interest on city money on deposit in local banks from 2 to 2¼ per cent. The Seattle Clearing House Association has refused to accept city money at a higher rate than the present 2 per cent, and the city faces the prospect on Jan. 1 of having $5,000,000 with no place to bank it.

Davenport Proud of New Utility Building

United Light & Power Company Completes New Spacious and Luxurious Headquarters, Containing Offices of Tri-City Railway and People's Light Companies—Many Advantages Cited in Having Home Office in Davenport

WHILE the achievements of railway companies for 1926 are being recorded the United Light & Power Company will occupy a conspicuous position for the completion of its new home project in Davenport, Iowa, at a cost of $500,000. This headquarters building, located at Second and Perry Streets, now houses the operating, engineering, securities, purchasing, sales and other important departments of the seventh largest American public utility company.

In April of last year the public inspected the new building, which serves now as the pivot of contact between officials and patrons of the People's Light Company and Tri-City Railway. Here municipal and all local problems are solved—customers pay their bills, invest in preferred stock and purchase railway tickets, with much more satisfying results than if the central offices were located in New York, Chicago or Grand Rapids. The wisdom of having a home for the first time in Davenport is credited to B. J. Denman, general manager, who saw in the cramped rented quarters the company was occupying an impediment to its progress, and in the erection of adequate facilities right in the heart of the operating territory another milestone in the great development of this utility, of which he is the head. Officials believed that a lower cost of living for the operating staff, as well as more pleasant living conditions generally, was among the advantages to be obtained by having the headquarters in a smaller community where one of the properties was located. The erection of its own building in any large center would hardly have been possible because of high building and real estate costs. But in addition to personal gains the municipality has gained an asset in the addition of such a building to adorn the downtown district of Davenport.

A brief description of the plan of the building was published in ELECTRIC RAILWAY JOURNAL, issue of Jan. 3, 1925, page 48. The building has five stories and a basement, with a mezzanine floor, but is designed for the addition of three more floors. The exterior of the building has limestone facing the first two stories and a combination brick and stone treatment for the balance. The first floor is occupied entirely by the People's Light Company. Here are demonstrated the utilitarian purposes of this great company in the form of display counters, information desk, cashiers' counters, but in addition the æsthetic ideal is not lost sight of. The bases around all exterior walls and columns are Verde antique marble. The woodwork in the room, including paneling around sills, windows and display counters, is genuine American black walnut.

Off one lobby to the east is located the railway cashier's booth, available to the public for the purchase of tickets and other business with the railway department. These booths are of the latest bank fixture design and the floors and base in this space are of marble. The banking fixture itself is art metal finished to imitate walnut, and all paneling in connection with this room and the counter fronts is genuine black American walnut.

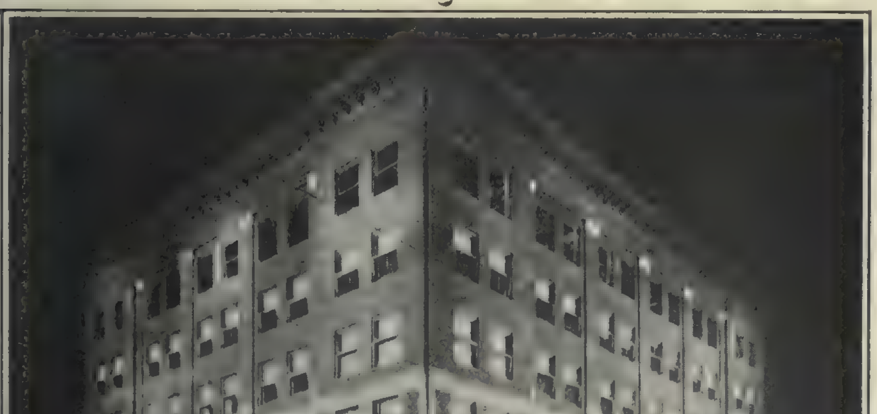
Large ornamental stairs in the main sales floor lead to the basement, the front part of which is devoted entirely to additional salesroom space. The mezzanine floor is connected to the first floor by a wide stairway leading to a balcony in the main sales floor, which extends across the entire east end of the same. This mezzanine floor is taken up by the accounting departments.

The second floor is given over to various United Light & Power Company officials. There are offices for the manager and assistant manager of the People's Light Company, general manager and assistant general manager of the Tri-City Railway, purchasing department, advertising department, industrial engineer, sales manager and claim department. There is also located on this floor a large assembly room, and in connection with this room are waiting rooms and a large serving kitchen.

The third floor contains the securities department, appraisal department and the executive offices. A feature of the offices on this floor is the lighting arrangement. The private offices are illuminated with Curtis indirect silver fixtures. In General Manager Denman's office four Curtis direct specially designed fixtures are used. Intensity in all offices is from 8 to 10 foot-candles.

The fourth floor is given over entirely to the engineering department. The fifth floor has been partly finished and completion will be carried on at once so that it will be ready for expansion of the various departments. The chemical laboratory is located on the fifth floor, for the purpose of carrying on research and analytical work for all the properties of the company.

Theoretically, the building was started years ago, when the Tri-City was just beginning to make strides in electrical development. Years of careful planning, use of business acumen and propagation of ethical standards laid the foundation for this structure.



Something for Davenporters to Be Proud Of

$680,000 Improvement Program for Minneapolis

The building program of the Minneapolis Street Railway, Minneapolis, Minn., for 1927 to be considered on Dec. 30 by the street railway committee of the City Council totals $680,000, with a major project the beginning of another interurban line to St. Paul. This will be a crosstown line in south Minneapolis made by extending the Oak-Harriet line on 50th Street from Penn Avenue south to connect with the Bryant-Johnson line at Bryant Avenue fourteen blocks; on the Bryant line to 42d, thence a new track to connect with the Grand Avenue line at Grand Avenue and 42d Street; also extension of the East 25th Street line across the Ford bridge to be opened over the Mississippi River, a point where the Randolph line has a terminus on the St. Paul side. By the eventual extension of the proposed 42d Street line to connect with the East 25th Street line near the west terminus of the Ford bridge a fourth interurban line will be a fact. Also there is proposed an extension of the Oak-Harriet line on Penn Avenue south to 54th Street.

Higher Fare in Petersburg and Norfolk

Quick action was taken on Dec. 21 by the Virginia Corporation Commission on two petitions of the Virginia Electric & Power Company for increased transportation rates. The decision means that the car riders of Norfolk and Petersburg will pay higher fares after Jan. 1. With the granting of higher fares the Virginia Electric & Power Company promises to give better service in both cities. This will be accomplished by changes in routes and additional equipment. Fare zones will be abolished in each of the cities.

The Petersburg application was heard Dec. 21. In that city the company will issue four tokens for 25 cents, with 7 cents as the straight fare. School tickets will be sold for 3½ cents and free transfers between electric cars and buses will be given. The present fare in Petersburg is 6 cents.

The Norfolk case, which also had the support of municipal authorities, was heard recently, but the commission withheld consent to the increase until additional documents could be presented. The new fare in Norfolk will be 10 cents cash, three tokens for 25 cents. A weekly pass will be issued for $1.50 and school tickets will be sold for 24 for $1. The present fare in Norfolk is 8 cents. Transfers will be given between the cars and buses.

Cincinnati Has New Emblem

A new insignia will appear on all cars operated by the Cincinnati Street Railway, Cincinnati, Ohio, as fast as the cars are overhauled and repainted. The new emblem pictures the street car and bus and includes the name of the company. Adoption of the insignia followed a contest conducted by the company covering a period of six months, during which 350 designs were submitted. A combination of six designs, however, afforded just what was desired and the $50 offered for the winning insignia was divided among the six contestants. The new insignia will also be used on uniforms, buttons, badges and advertising of the company.

In commenting on the contest, Hudson Biery, Director of Public Relations, said that many of the designs used words describing the advantages of street railway service. These were not used as the company felt that the service must speak for itself. He said: "We want the car and the coach and the words 'Cincinnati Street Railway' finally to become known to the public eye as standing for good service."

Boston Electrification Not Favored

The Metropolitan Division of Planning, Boston, Mass., has disapproved the proposed plan for the electrification of the Saugus branch of the Boston & Maine Railroad between Everett and West Lynn, because of its prohibitive cost. In its report to the Massachusetts Legislature the planning board has suggested that the branch be electrified for overhead operation. This plan would do away with a proposed underpass at the railroad. This project would cost far less, outside of new rolling stock, and would be an asset to the development of the territory served. Opportunities are numerous for real estate subdivisions over the line, as well as industrial plants. In order to accomplish this end co-operation would necessarily have to exist between the railroad and the railway. The Boston & Maine would abandon passenger service and the Eastern Massachusetts Street Railway would take care of that end. Regarding the operation of trolley cars, half-hour headway was recommended with more frequent service during rush hours. The Boston & Maine would continue to operate freight trains over the Saugus branch, which would not interfere with trolley traffic.

Would Draft New Franchise for Omaha

A movement is on foot to draft for submission at the May election a new franchise for the Omaha & Council Bluffs Street Railway, Omaha, Neb., to take the place of the one shortly to expire. The voters refused their approval some months ago to the franchise asked for by the company. The present suggestion is that John P. Breen, attorney in charge of the opposition at the last election, and others competent to do so draft a grant that will embody conditions they think the city should include in a new offer.

The principal objections to the franchise defeated were that it ran for too long a period, that it exempted the company from all share in the burdens of paving and also relieved it of occupation taxes. Mr. Breen says that he is not opposed to a renewal of the franchise and that he is opposed to municipal ownership at this time. He adds that it is plain that it is in the interest of the city to pass a new grant.

If one can be drawn acceptable to the company it is possible to submit it in May and give the company an opportunity to refinance by Jan. 1, 1928.

Stopping Service To Serve

YESTERDAY morning an elderly woman stood midway on a Grand Rapids street made slippery by sleet and rain. She had made the crossing half way, when traffic began to increase, and she dared not trust her unsteady feet for a quick dash in front of swiftly moving automobiles. A motorman, keen of eye and sympathetic of heart, had, however, seen her a half block away. He stopped his street car, helped the old lady across the street and resumed his post.

Probably the passengers who failed to witness the episode, grumbled at the delay, as passengers will when service is interrupted. But not one of them, knowing the facts, would remonstrate a syllable against delay for such a reason. When service becomes a Frankenstein to which the humanities must give way, it ceases to be service at all. *Grand Rapids Herald.*

Community Day in Wheeling Featured by Free Rides

Another wholesale purchase of railway service was witnessed—this time in Wheeling, W. Va., when on Nov. 12 the first community day was held. Approximately 50 merchants in the city of Wheeling purchased the railway service inbound between the hours of 9 a.m. and 12 noon. When passengers boarded the cars during the morning they were handed cards reading "Good morning, you are the guest of George E. Steifel Company, which is this morning beginning its 48th anniversary sale."

During the day 21,000 people rode to the city on street cars and 15,000 of them came during the three-hour period as guests of the merchants. The merchants estimated a total of 25,000 visitors to the stores and business took on the aspects of a Christmas rush. Not only did the stores profit by large sales but restaurants and theaters enjoyed capacity crowds during the afternoon and evening.

In commenting on the matter editorially, the Wheeling *Register* said in part:

> To put it tersely, community day went over bigger than expectations warranted. The occasion will not be of temporary benefit to Wheeling merchants and out-of-town shoppers alone. It will form a contact between the two that will bring satisfied customers to the city next week and weeks to come.

It is understood that Wheeling merchants and business men are so well pleased with the success of the first community day that it is to be repeated at frequent intervals.

Pasadena Loses in Fare Issue

The Supreme Court of California has denied two petitions for writs of review on the part of the city of Pasadena against the Railroad Commission in which the city of Pasadena contended that the Railroad Commission was without jurisdiction to regulate the rates and services of motor coach lines operated by the Pacific Electric Railway in that city. Those cases arose out of applications on the part of the Pacific Electric Railway for increases in fares over those motor coach lines. It was the position of the city of Pasadena that since those lines were operated under contract with the city and pursuant to a franchise which it had granted, and since the Railroad Commission was not given authority over motor vehicle operations solely within the limits of municipalities, the commission had no authority to consider the question of rates for this service. In its answer to the Supreme Court, the Railroad Commission pointed out that one of those lines extends for a short distance outside the city of Pasadena, and contended that unless operations were conducted exclusively within the city limits the commission possessed authority over the entire operations.

The Supreme Court's decision denying the writs of review asked by the city of Pasadena in effect sustains the position of the Railroad Commission, and the effect of the cases is to hold that the commission does possess complete authority over motor vehicle operations such as are conducted by the Pacific Electric Railway in Pasadena.

Large Downtown Terminal in Chicago for North Shore

A passenger terminal much larger and more attractive than the old one was recently opened to the public by the Chicago, North Shore & Milwaukee Railroad in the downtown section of Chicago.

The new station occupies the entire basement, first and second floors of an eight-story office building. A ticket window, information booth and checking counter occupy the front of the first floor, where large walnut benches provide comfortable waiting facilities for travelers. The rear of the first floor is occupied by a restaurant and lunch counter operated by the North Shore Line's commissary department and is equipped for prompt and adequate dining service. The entire main floor is finished in marble and walnut with brass fixtures.

In the basement there is a commodious smoking room for men, while on the mezzanine floor, at the first landing of a broad marble staircase, may be found the ladies' waiting and rest room, a handsome suite equipped with upholstered furniture.

The second floor provides an additional ticket window and chairs for waiting passengers. At the rear are show windows where displays of household furnishings add to the cosiness of the surroundings. A second story bridge connects the upstairs waiting room with the Adams Street elevated station, where passengers may board all North Shore Line trains.

A system of electric amplifiers is used to announce the arrival of trains loudly and clearly throughout all parts of the station. Illuminated signs direct passengers to all points of service. The new station will serve as a model in future development of all North Shore Line terminals.

Construction of Maine Project Awaited

The consent of A. R. Graustein, president of the International Paper Company, to allow United States Senator Arthur R. Gould of Presque Isle, Me., to cut timber in the company's holdings across northern Maine is all that is necessary for the building of the proposed electric railway through the woods of northern Maine into the Province of Quebec. The certificate granted by the Interstate Commerce Commission for construction lapses Dec. 31 and cannot be renewed. Mr. Gould has stated that the syndicate had been organized and that work would be started as soon as the question of this permit was settled. The Gould project will be 111 miles in length, running straight across Maine from Washburn in Aroostook to Lake Frontier to connect with the Quebec Central and it will be wholly through virgin territory, opening up new land for farming.

More than a year ago an investigating committee recommended to the Interstate Commerce Commission the construction of 111 miles of electric railroad in Aroostook County, Me. At that time it was said that the new line would be known as the Quebec Extension Railway. The estimated cost was $4,000,000. Later a tentative report of the Interstate Commerce Commission by examiners opposed the project. This Maine project has been referred to previously in the ELECTRIC RAILWAY JOURNAL.

News Notes

Children's Rates Adjusted.—The California Railroad Commission has dismissed the application of the Santa Barbara & Suburban Railway, Santa Barbara, Cal., for authority to readjust special rates for school children. The matter was adjusted informally.

Kiwanis Club Honors Railway Man.—C. D. Smith, general manager of the Beaver Valley Traction Company, New Brighton, Pa., was elected president of the Beaver Falls Kiwanis Club at its recent meeting. The club was addressed by Judge W. A. McConnel, who discussed the "Underprivileged Child."

One-Man Cars Allowed.—The Public Service Commission recently granted permission to the Eastern New York Utilities Corporation, Albany, N. Y., to use new light-weight one-man safety cars. Evidence submitted to the commission showed that in 1922 the company operated with a deficit of $50,542; in 1923, $32,400; 1924, $39,093; in 1925, $54,501, and for the first ten months of 1926, $79,270.

Hot Time Promised in Baltimore.—Following complaints filed with the Maryland Public Commission, the United Railways & Electric Company, Baltimore, has agreed to increase the minimum temperature in its street cars from 40 to 45 deg. The commission passed an order calling for the 45-deg. minimum. The minimum of 40 deg. was established by the commission in 1916. New thermostat controls made necessary by the change are being installed as well as thermometers "to disprove charges of arctic temperatures."

Transit Aides in Conference.—City Solicitor Gaffney of Philadelphia, Pa., has assigned John B. Gest, an assistant city solicitor, to investigate the protests against the curtailment of service and operating policies of the Philadelphia Rapid Transit Company which were turned over to him by Mayor Kendrick. George L. Bright, special statistician and traffic engineer of the department of transit, will aid Mr. Gest in his work.

Extension Matter Up in St. Paul.—Extension of the Snelling Avenue line of the City Railway, St. Paul, Minn., ¾ mile is to begin in the spring, as the company does not believe the court which ordered the extension will require construction in winter. The order is under an ordinance adopted by the city Dec. 30, 1924. The company contended that the extension would add about $18,000 to annual cost of operation without any substantial increase in revenue. Judge Charles Bechhoefer of the Ramsey District Court held the Council ordinance is a proper exercise of authority to compel necessary service. The company has forty days to appeal to the State Supreme Court.

New Disposition of Old Cars.—The Georgia Railway & Power Company, Atlanta, Ga., instead of burning its obsolete equipment has given away two of its cars to Frank Dabney and Frank Neely, Atlanta. More than twenty applications were received for the first two cars to be advertised. Mr. Dabney will set up his car in his front yard where it will be used as a meeting place for Boy Scouts and community ladies' clubs. Mr. Neely will present his car to a local orphans' home for a playhouse.

Plans Service Improvements.—A survey of the properties of the Macon Railway & Light Company, Macon, Ga., is now under way under the supervision of Horace Fligg, transportation engineer of the Atlanta office of the Georgia Light, Power & Railways Company, which controls the Macon property. It is expected that a considerable amount of new equipment will be installed.

Railway Man Honored.—Frederic H. Hill, vice-president and general manager of the Elmira Water, Light & Railroad Company, Elmira, N. Y., was recently elected president of the Association of Commerce to serve during the current year. In addition to his important position as vice-president and general manager of the Elmira property, he is associated with every local civic movement. The Elmira Advertiser of Dec. 21, commenting on his election, said that the saying "If you want something accomplished, get a busy man," was exemplified in the selection of Mr. Hill.

Time Extended on Freight Hauls.—The Salt Lake & Utah Railroad, Salt Lake City, Utah, will be allowed to participate in westbound transcontinental freight hauls until Feb. 12, 1927. The extension of time was granted the road by the Interstate Commerce Commission until it has time to make the final decision on the case to determine whether the railroad can participate in westbound transcontinental freight business. W. C. Orem, former president and now assistant to the receivers of the line, in explaining that the Salt Lake & Utah could not participate as an intermediate carrier in eastbound transcontinental freight hauling, pending the final decision, said it was apparent at the oral arguments before the entire commission at Washington that there was a discrimination against the Orem line and his company hoped for a favorable decision.

Skip-Stop Issue to Be Heard.—The committee on railways and franchises of the Baltimore City Council has postponed action on a resolution which has been introduced requesting the Maryland Public Service Commission to order the United Railways & Electric Company to discontinue the skip-stop system in operation in the morning and evening rush hours. The committee held a hearing on the subject on Dec. 20, at which several persons opposed the skip-stop. Philip B. Perlman, former City Solicitor of Baltimore, represented the United. He pointed out that the Public Service Commission had not concluded its investigation of the complaints it had received against the plan and for this reason the committee postponed action until Jan. 10.

Recent Bus Developments

Equitable Coach Favored

Bus Grants in New York to Be Considered Jan. 15—New York Railways Modifies Petition

A majority of the members of the Board of Estimate, New York City, N. Y., is said to have agreed on the awarding of franchises for bus operation in Manhattan, Brooklyn and Queens to the Equitable Coach Company. It is believed that the preliminary award will be made before Jan. 15. It must then be followed by four weeks of advertising and confirmed by the Transit Commission by the grant of a certificate of convenience. At the same time the board will grant a bus franchise for operation in the Bronx to the Surface Transportation Corporation, a subsidiary of the Third Avenue Railway. As far as Richmond is concerned, it is said that an attempt to award a franchise will be made soon after the franchises for the four other boroughs are finally determined.

The agreement was reached on a 5-cent fare zone basis. Long routes will be divided into 5-cent fare zones. In Manhattan, Brooklyn and Queens the Equitable company will charge 2 cents for transfers between intersection lines in the same zone. In the Bronx the Surface Bus Corporation will give free transfers between intersecting lines in the same zone. Each company will pay the city 3 per cent of the gross receipts from operation. The duration of the franchise will be for ten years with privilege of renewal for another ten years if operation is satisfactory to the city administration.

The Equitable Coach Company will operate 352 buses in Manhattan, 224 in Brooklyn and 196 in Queens. Its total investment for bus operation will amount to approximately $15,000,000. The equipment will include both single-deck and double-deck buses. The Surface Transportation Corporation will operate 81 buses in the Bronx with a total investment of about $1,500,000. It is expected both companies will begin the construction of garages and place orders for new equipment as soon as the franchise contracts are signed.

The sponsor of the Equitable Coach Company project is J. G. White & Company, Inc. According to the company's application that banking firm is responsible for both the financing and management of the Equitable Coach. Different groups of capitalists are mentioned as being interested in the Equitable project, but no definite information on this aspect of the situation is available.

The award agreement followed fast upon the statement of Mayor Walker that if no award on bus franchises were granted soon he would introduce a resolution to award the franchise at an open meeting. He said that there had been an unreasonably long delay since the bus report of the Board of Transportation more than three months ago. City authorities expected opposition by existing transit companies on the ground that some of the routes proposed by the Board of Transportation would compete with existing surface and bus lines. The Mayor has been told that he will receive up-state support in any attempt to eliminate the legal requirement for the issue of certificates of convenience and necessity by a state body, such as the Transit Commission or Public Service Commission, and to give each city in the state "home rule" in transit matters, including the establishment of new bus routes.

Following publication of the statement that a majority of the Board of Estimate had decided on the award just mentioned the Manhattan Surface Coach Company, affiliated with the New York Railways Corporation, sent a letter to the Board of Estimate on Dec. 28 amending its application for a Manhattan bus franchise by offering terms more favorable to the city than those in its earlier applications. It offered a 5-cent fare zone system exactly like that proposed by the Equitable Coach Company. In addition it offered to give transfers for 2 cents each to intersecting surface lines of the New York Railways system and asked a franchise for only four years. This letter, signed by H. J. Sheeran, president, follows:

> On May 19, 1926, the Manhattan Surface Coach Company, a subsidiary of the "New York Railways Corporation," amended its application No. 1 for a franchise to operate buses in Manhattan to provide for a 5-cent zone fare system. The zones proposed and the fare proposed by the Manhattan Surface Coach Company were in all respects exactly identical with those proposed by the Equitable Coach Company in Manhattan, excepting that the latter company proposed no zoning on First or on Park Avenue.
>
> We now propose to further amend our application No. 1 for a franchise to operate buses in Manhattan so as to make the fare to be charged and the zones to be established in Manhattan exactly similar to those proposed by the Equitable Coach Company in its several petitions dated Nov. 18, 1925; Feb. 13, 1926, and June 21, 1926.
>
> In addition, we further amend our application No. 1 so that in addition to the transfer privileges set forth in the proposal of the Equitable Coach Company, all of which we hereby incorporate in this amended proposal, we will also provide for the exchange of transfers upon the payment of 2 cents at all intersections of the proposed bus routes with the existing railway lines of the New York Railways Corporation, so that a passenger, upon the purchase of a single transfer for the sum of 2 cents, may have the alternative of using that transfer on either an intersecting bus line of the Manhattan Surface Coach Company or an intersecting trolley line of the New York Railways Corporation.
>
> Thus our application is more favorable to the city and the public than that of any other company, as no other company is in a position to give this interchangeable service.
>
> We further point out that we have applied for a franchise for only four years, with a privilege of renewal for a further term of four years, as against a ten-year application of the Equitable Coach Company, with a right to renew for ten years.
>
> As to our financial responsibility, we, together with the Fifth Avenue Coach Company, which will assist in the financing and operation of the system, have today on hand or in bank $4,200,000 in cash and liquid securities and have ample resources worth many millions of dollars and ample credit to permit us, without any further financing of any kind, to establish the system.
>
> We are able to put a complete bus system into operation immediately and will have the personnel, garages already established and experience of the Fifth Avenue Coach Company to draw upon.
>
> The New York Railways Corporation has been in existence in New York many years and has millions invested in its properties on which its security holders have had but scant return. Last year it carried approximately 146,000,000 passengers. To award the bus franchise to an outside company and divert millions of passengers away from it would further very materially cripple the road and its ability to be of service to the public. It has now under way a rehabilitation program calling for the expenditure of upward of a million dollars, and if given a fair opportunity will do its best to enlarge that program.
>
> The New York Railways Corporation has no interest whatever or any affiliation with any other surface car lines or rapid transit lines in New York City, and none of its stock or the stock of its affiliated companies is owned or controlled by any existing surface lines or rapid transit lines in the City of New York or by any of the persons in control of those companies. It is an entirely independent transportation agency.
>
> We feel that our company with its large investment and extensive operation, which it has labored so hard to maintain in the face of increasing difficulties, is entitled to and will receive the utmost consideration from those who are safeguarding the interests of the people, both who use these lines and whose investments lie in these properties.

Receiver for Purple Swan Line

The Purple Swan Safety Coach Lines, Inc., operating in and around East St. Louis, Ill., has just been placed in temporary receivership. Circuit Judge Calhoun appointed William H. Schaumberg, an attorney, to the post. A hearing on a permanent receivership will be held on Jan. 6. Allegations were made that the company had outstanding debts of more than $250,000. The company has expanded rapidly since last June and now is carrying an average of 2,000 passengers a day. Its main lines emanate from St. Louis to Kansas City, Chicago and Indianapolis. The president is J. H. Darlington, Louisville, Ky. As indicated in the ELECTRIC RAILWAY JOURNAL, issue of Nov. 13, 1926, page 905, some of the Purple Swan lines were operated in competition with the Blue Goose line, owned and operated by the East St. Louis & Suburban Railway.

Railway's Subsidiaries in Baltimore Consolidate

Under the provisions of an order passed by the Maryland Public Service Commission, the four bus companies in Baltimore controlled by the United Railways & Electric Company have been consolidated under the name of the Baltimore Coach Company. At the same time the commission authorized the newly organized company to issue 5,000 shares of common stock without par value and granted permission for the United Railways & Electric Company to acquire all the capital stock so to be issued in exchange for all the shares of stock in the four companies which go to make up the new concern.

The change means the consolidation of the bus lines operated by the United into one concern controlled by the railway. The four consolidating companies are the Baltimore Transit Company, the City Motor Company, the East Fayette Street Bus Company, Inc., and the Baltimore Bus Company.

Bus Bill Planned by Louisville

Regulations similar to those proposed two years ago will be written into a bill for jitneys, buses and other transportation conveyances, it was said recently, by the Public Utilities Bureau of Louisville, Ky. The measure would be substituted for the bill introduced a short time ago in the General Council.

The new bill would require registration of jitneys and their drivers, ownership including the number of persons having financial interest in the transportation concern; would require a declaration of the rate of fare, the routes to be operated on and the terminals; would demand the establishment of a fixed schedule and other operating points.

The bill also would demand a blanket insurance of $50,000, it was said, provided the jitney owners establish an organization, or $2,000 for each operator provided the blanket license cannot be arranged. The jitneys would be placed under the Board of Public Works. Permits, which would have to be obtained, could be revoked for cause, such as conviction of traffic laws or other laws, and would establish other minor regulations.

Bus Activity of Great Northern Curtailed

The Northland Transportation Company, a bus subsidiary of the Great Northern Railway, has been given conditional permission by the Minnesota Railroad and Warehouse Commission to discontinue through bus transportation between Minneapolis and St. Paul Jan. 1, 1927. This service was operated at a heavy loss. It is provided that the company enter into an operating arrangement with other bus companies for transferring and transporting all incoming and outgoing passengers between St. Paul and Minneapolis holding tickets to the other cities on scheduled vehicles of the Twin City Motor Bus Company, Jefferson Highway Transportation Company and the Twin City & Southern Bus Company.

This removes fifteen buses leaving St. Paul and twelve from Minneapolis, and leaves ten from Minneapolis and nine from St. Paul. Pick-up service between the Twin Cities is permitted the Twin City Motor Bus Company only, so that the Northland company gained no revenue from this source. Notwithstanding strong protest by St. Paul business interests, the commission found the service which is to be discontinued not required by public convenience and necessity.

Chicago Bus Hearing Continued

A new type of bus, designed to be used in Chicago, Ill., if the Chicago Motor Coach Company secures a franchise from the city for city-wide operation, was described to Alderman John Toman's sub-committee of the City Council's local transportation committee at the hearing on Dec. 21. As a result the committeemen decided to visit the coach company's plant and inspect the new vehicle. So the meeting adjourned to Dec. 28 after John A. Ritchie, president, and James G. Condon, attorney of the motor coach company, had answered questions from the committee members.

Gary Railways Asks Right to Operate Additional Bus Lines

Permission to establish a new de luxe type of motor coach service on Broadway, Gary, Ind., between 52d Avenue and the New York Central station, was asked on Dec. 16, in a petition filed with the Indiana Public Service Commission at Indianapolis by the Gary Railways. The plan as set forth in the company's petition is in answer to repeated requests from residents of the far south side of the city for faster and more comfortable service to the downtown district. In case the authority is granted by the commission, the company proposes to put into immediate effect an hourly limited stop service between these two points. The schedule is arranged primarily to afford convenient connection with all South Shore Line express trains for the Chicago Loop. For this superior type of coach service a fare of 15 cents is contemplated. No transfers will be issued.

In another petition filed with the commission the Gary Railways seeks permission to extend its present coordinated bus and railway service into the southwest portion of the City of Gary, many blocks in which are now without adequate transportation. The purpose of this project, as stated in the petition, is to place all homes in that section within a quarter of a mile or less of either street car or bus service. This new coach service would be provided with the present city-type of bus between 6 and 9 a.m. and 3 p.m. and 7 p.m. A 10-cent fare will be charged and transfers will be issued and accepted to and from connecting trolley and coach lines of the company.

Would Operate Buses.—The Tennessee Electric Power Company recently asked permission of the State Railroad and Public Utilities Commission to operate buses on the streets of Chattanooga, Tenn. The commission took the request under advisement. The city of Chattanooga and Hamilton County have already approved the terms under which the company proposes to install the service.

Reports Unfavorably on Bus.—A proposal from the York Township Council that the Toronto Transportation Commission provide a bus service in the Silverthorn district was reported upon unfavorably by D. W. Harvey, general manager of the Toronto Transportation Commission, because of the lack of patrons. The township Council decided to ask the Toronto Transportation Commission for a report on what the probable loss would be on such a service with a view to having it established if the loss would not be too great. Mr. Harvey also reported unfavorably on a proposal to replace car service by bus service on Lambton Street car line between West Toronto and Lambton, a distance of 1 mile. He claimed the change would mean financial loss to the township, which would have to continue paying charges on the car line whether or not it was operated.

Buses Substituted.—The Pubilc Service Commission on Dec. 14 authorized the Westchester Street Transportation Company, Inc., to substitute buses for cars upon tracks on a portion of its route in the city of White Plains, from the New York Central tracks on Main Street in White Plains, N. Y., to the dividing line between the village of Scarsdale and the city of White Plains. The White Plains situation was reviewed in the Third Avenue Railway report.

Would Extend Line.—The Key System Transit Company, Oakland, Cal., has applied to the Railroad Commission for a certificate to operate bus service as an extension of its Fernside bus line from the intersection of East Fourteenth and High Streets to the intersection of Ygnacio Avenue and High Street, Alameda County.

Buses Supplement Railway Service.—The Kentucky Utilities Company has recently placed three large buses in service in Paducah, Ky. This service supplements the present local railway system of the company.

Reports Favorably on Buses.—The Lincoln Traction Company, Lincoln, Neb., reports satisfactory experience with the buses it has been operating for some weeks as a substitute for and a complement to railway service. During the first two weeks of operation of the bus line to the state penitentiary, located in a suburb 4 miles from the business center, the revenues were $446 and for the second two weeks, $606, an increase of 35 per cent. Weather conditions were about the same as last year, and the number of persons hauled was about the same as the railway carried a year ago. On bus lines operated to the Agricultural College and University Place, northeast suburbs, the first eight days of operation brought revenues of $462, and the next eight days, $552, a 20 per cent increase.

Commission Order Calls for Buses.—The Public Service Commission has approved the petitions of the United Traction Company asking for the abandonment of portions of its route in the city of Rensselaer, N. Y., on Broadway and Aiken Avenue and also the Third Street line. The orders of the commission provide that the United Traction Company, on direction of the Common Council of the city, remove all of its existing structures from the streets affected and restore the portions to as good condition as the adjoining parts of said streets are at present. These orders are not to take effect unless and until the United Traction Company files with the commission an agreement to the effect that, by and with the consent of the city of Rensselaer and of the commission, transportation will be furnished to the territory now served by the portion of the route to be abandoned by means of buses with the same rate of fare and transfer privileges as are in force on the railway, and with an interval of service not greater than that which is now maintained on the Broadway and Aiken Avenue line and on the Third Street line.

Financial and Corporate

Surplus of $94,031 on New York State Lines

The report on operation of the Rochester lines of the New York State Railways for the year ended July 31 last, submitted to Mayor O'Neil and the Common Council on Dec. 14 by Commissioner of Railways Charles R. Barnes, shows a surplus of $44,897 above the return provided in the service-at-cost contract between the railways and the city. A surplus of $94,031 is shown in street car operations and a deficit of $49,134 from bus and trackless trolley operations. The balancing fund which regulates the rate of fare showed an accumulated deficit of $281,338 as of July 31.

Commissioner Barnes in his report emphasized the steady decrease in passenger revenue owing to the increased use of the automobile and pointed to the increased expenditures because of pavement repairs and new paving, in addition to track renewals.

Passengers carried during the year totaled 95,499,202, a decrease of 2,333,395 over the preceding year. While trolley riders declined by 2,619,673, passengers on buses and trackless trolleys gained by 286,278. The fewer car riders were served by 132,764 more car-miles than in the previous year. The operating system, according to the report, now embraces 169.14 miles of railway trackage, 2.75 miles of trackless trolleys and 53.55 miles of bus routes.

Anent the automobile problem, the commissioner said that the trolley system was naturally affected more seriously and adversely than any other agency by the problems arising from the increased use of the automobile, especially in the business section. The problem was new and one born of modern conditions, and thus far it had not been met successfully. Free movement of street cars as well as the safety and convenience of automobile riders required and would require, in the future, an increasing amount of careful and earnest attention.

Regarding paving costs, Commissioner Barnes said it was well known that where new paving was laid in the city street or where repaving took place the cost of paving within the operating strip and 2 ft. outside on either side was borne by the transportation system. He referred to the general injustice of that situation, due to the fact that this paving surface was used entirely by automobiles and not by street cars. It was felt the Legislature ultimately would adopt corrective measures.

SUMMARY OF REPORT OF ROCHESTER LINES

	Railways	Bus Lines	Combined
Revenues from Transportation:			
Passenger revenues	$5,128,665	$88,235	$5,216,901
Chartered car revenues	2,700	......	2,700
Bus rentals	......	906	906
Mail revenues	82	......	82
Miscellaneous transportation revenues	2,062	127	2,190
Total revenue from transportation	$5,133,511	$89,269	$5,222,780
Revenue from other railway operations:			
Station and car privileges	$55,167	......	$55,167
Rent from tracks and facilities	37,453	......	37,453
Rent from buildings and other property	14,771	....	14,771
Total revenue from other railway operations	$107,391	....	$107,391
Total operating revenues	$5,240,902	$89,269	$5,330,172
Operating expenses:			
Way and structures	$474,883	$1,484	$476,367
Equipment	367,868	27,774	395,643
Power and gasoline	284,229	11,356	295,585
Conducting transportation	1,699,268	34,359	1,733,627
Traffic	14,416	3	14,419
General and miscellaneous	551,444	32,201	583,645
Renewals and depreciation	215,000	19,401	234,401
Total operating expenses	$3,607,110	$126,580	$3,733,691
Net operating revenues (deficit)	$1,633,791	$37,310	$1,596,480
Auxiliary operating revenues	$3,023	....	$3,023
Auxiliary operating expenses	3,776	....	3,776
Auxiliary operating deficit	$753	....	$753
Net revenue—All operations (deficit)	$1,633,037	$37,310	$1,595,726
Taxes assignable to operations	375,691	1,469	377,160
Operating income	$1,257,346	$38,779	$1,218,566
Non-operating income	10,261	....	10,261
Gross income	$1,267,607	$38,779	$1,228,827
Return on investment	1,173,575	10,354	1,183,229
Service-at-cost operating surplus or deficit	$94,031	*$49,134	$44,897

* Deficit

New York Companies Merged

The Eighth & Ninth Avenue Railway, New York, N. Y., formed by consolidation of the Eighth Avenue Railroad and the Ninth Avenue Railroad, has been chartered at Albany with 58,000 shares non-par value. Joseph Tate, Plainfield, N. J.; William Henry Hays, New York City, and James G. Affleck, Yonkers, N. Y., are directors and subscribers. Michel Kirtland, New York, is attorney.

The joint petition for the consolidation was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 18.

$8,672,135 Probable Expense in Cincinnati

The estimated expense for the operation of electric cars and motor coaches by the Cincinnati Street Railway, Cincinnati, Ohio, in 1927 aggregate $8,672,135. The budget of the company has been approved by Edgar Dow Gilman, Director of Utilities, with two reservations.

The budget shows a probable loss of approximately $126,000 in the operation of buses, and on that point the director says, "steps will be taken as soon as practicable so to change the condition as to make motor coach operations more nearly self-supporting." It was indicated that certain lines which parallel railway routes may either be discontinued or the fare increased so that the deficit in their operation will not be charged to the electric car riders. Mr. Gilman also comments upon the fact that no allowance is made in the budget for depreciation. It is understood, he said, that it is the purpose of the company to refund the Cincinnati Traction Company equipment trust certificates falling due in 1927 by the issuance of other securities as is provided for in the franchise. This is not in accordance with the policy of the director that the basic principle to be observed in making proper charges is to keep the capitalization as nearly as possible equal to the physical value. The refunding of these certificates does not reduce the liability of the company and the capitalization remains constant, although there is a continued depreciation in the physical value. The operating expenses as indicated in the budget are as shown in the accompanying table.

CINCINNATI STREET RAILWAY
OPERATING EXPENSES

Way and structures	$ 926,122
Equipment	797,135
Power	951,472
Conducting transportation	2,990,438
Traffic	42,600
General and miscellaneous	631,481
Total	$6,339,248
Rental of viaducts	6,500
Taxes	734,798
Fixed charges	403,492
Return on capital	1,188,097
Total	$8,672,135

Chicago City Railway Hopes to Escape Receivership

Less than 24 hours after the Chicago Railways had passed into the hands of receivers Leonard A. Busby, president of the Chicago City Railway addressed a letter to the local transportation committee of the City Council in which he announced his company's willingness to accept a six months extension after Feb. 1, on whatever terms the city chooses to make. Mr. Busby made no direct comment on the receivership of the Chicago Railways. In illustrating his contention that a receivership for the south side lines would not be warranted, Mr. Busby pointed out that the Southern Street Railway—one of its component parts—had no indebtedness of any kind and that the present earnings of the other two units of his lines compared with their bonded indebtedness created a favorable situation. Although the first mortgage bonds of these properties mature on Feb. 1, most of them have been deposited with protective committees which are a unit in not desiring a receivership, he said.

In expressing his willingness to negotiate with the city for an ordinance covering the extension, Mr. Busby said in his letter:

> I consider this step necessary and desirable, both from the standpoint of the public and the security holders. The six months period will enable the city and the companies to complete their existing negotiations and will also give the city an opportunity to procure enabling legislation at the next session of the Legislature which will be necessary to make effective the ordinance now being drafted for a unified and comprehensive transportation system for the city.
>
> Speaking for the south side lines, I wish to advise that we will accept an extension of our present ordinances for a period of six months.
>
> With reference to a receivership for the south side properties, we desire to advise that it is the intention of the management of the various protective committees representing security holders to do everything in our power to prevent a receivership following the maturity of some of our securities next February. We feel that if the holders of these securities co-operate with us by depositing their securities we will be able to avoid a receivership.

One-Third of P.R.T. Stock Owned by Employees

The co-operative wage fund trustees of the Philadelphia Rapid Transit Company, Philadelphia, Pa., purchased 25,000 shares of the company's stock during 1926 at a cost of approximately $42 a share after crediting dividends received and paying four quarterly dividends. This statement was made by President Hauseman of the association in *Service Talks* of Dec. 17, 1926. The total company stock in possession of wage fund amounts to 221,500 shares, which added to 10,000 shares of co-operative association gives employees ownership of one-third of their work shop. A co-operative wage fund participation certificate similar to those issued for the years 1922 to 1925 will be given early in 1927 to each employee certifying the number of shares of P.R.T. stock represented by the amount of his 1926 co-operative wage and held in trust by the co-operative wage fund trustees who will vote the total amount of 221,500 shares at the stockholders' annual meeting next March. President Slook of the co-operative association saving fund said that the company's saving fund had just passed the $2,700,000 mark, an increase of $100,000 for the year, and now has 11,202 depositors, the largest number.

W. R. Smith was elected president of the saving fund for 1927 and James Shivers vice-president.

Commission Approves Sale.—Formal approval by the Indiana Public Service Commission of purchase by the Fort Wayne-Lima Railroad of the Fort Wayne, VanWert & Lima Traction Company, recently bid in at a receiver's sale at approximately $150,000, was asked in a petition filed with the commission by the former company. The petition also asked approval of $100,000 in first mortgage bonds, $441,000 in general mortgage bonds and 10,290 shares of no par value stock. Reference to the sale of the property was made in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 11, 1926, page 1070.

Director Elected at Nashville. — James E. Carnes has been elected a director of the Nashville Railway & Light Company, Nashville, Tenn. He started with the corporation as messenger, and rose to the post of assistant to the vice-president.

More Money to Meet Indebtedness.—The California Railroad Commission has authorized the Key System Transit Company, Oakland, Cal., to use the proceeds from the sale of $777,161 of its first mortgage 6 per cent bonds, to pay indebtedness, instead of $770,161 as heretofore authorized.

Net Income Lower. — For the five months period ended Nov. 30, 1926, the passenger revenue of the Brooklyn City Railroad, Brooklyn, N. Y., was $4,687,521, against $4,687,117 for a similar period in 1925. Operating expenses and taxes showed a slight increase, being $4,011,721 for the five months ended Nov. 30, 1925, and $4,030,775 for the five months of 1926. After the consideration of income deductions, the net income for the 1926 period was $530,821, against $574,741 for the 1925 period.

Would Discontinue Last Trolley Line.—The City Council of Westfield, Mass., will take no action until 1927 on the petition of the Springfield Street Railway asking for permission to discontinue the one remaining trolley line in the city. No action by the bus license committee is expected, and as the railway plans to substitute bus service the matter will be shelved for the time being. A short time ago the Springfield Street Railway was granted licenses to operate several bus lines in Westfield, but experienced some difficulty in securing licenses. The service supplied by the bus lines since then has been excellent.

Would Discontinue Line.—The Portland Electric Power Company, Portland, Ore., recently filed a petition with the Public Service Commission asking permission to discontinue service on the Montavilla-Ruby Junction-Troutdale division of its lines. The company declared that this division was not profitable and that the deficit for the year 1925 was approximately $34,750; for the first ten months of this year the deficit was $34,074. It was also pointed out that the line was now in such a state that to continue it would require from $20,000 to $25,000 for roadbed and equipment repairs. If the petition was granted the company would care for its freight business through other connections.

Net Income Higher. — For the five months period ended Nov. 30, 1926, the total operating revenue of the Brooklyn-Manhattan Transit System, Brooklyn, N. Y., was $19,360,241, against $18,636,972 for a similar period last year. The total operating expenses increased from $12,044,740 to $12,347,806 in 1926. Following the consideration of total income deductions, a net income remained of $2,811,337, against $2,514,803 for the five months period ended Nov. 30, 1925.

Big Business in South Bend. — An indication of the large volume of business done during the Christmas holidays in South Bend, Ind., is given in figures compiled by the Chicago, South Bend & Northern Indiana Railway. The Saturday before Christmas all records were broken, with a total of 71,267 passengers handled, the day being the largest in the history of the company. Passenger traffic on interurban lines into the city also was very heavy.

Reports Loss.—Franklin T. Miller, receiver, has produced his seventh report on the operations of the Boston & Worcester Street Railway, Framingham, Mass. The operating revenues exceeded operating expenses from July 1 to Sept. 30 by $6,400. Taxes and interest, however, exceeded this amount by nearly $1,500. The receiver's report from Feb. 11, 1925, to Sept. 30, 1926, the total of the period of receivership, shows a net loss of $49,969.

Rainier Purchase Planned.—A campaign for the purchase of the Seattle & Rainier Valley Railway lines by the city of Seattle, Wash., has been undertaken by residents living in the Rainier Valley, who have started the groundwork for plans by which they hope to center the attention of every voter on the railway purchase issue at the election next March. The Rainier Railway Purchase League has been formed to handle the campaign, with Charles Weedin chairman. A purchase of the railway already has been authorized by the City Council and a deal consummated whereby the valley line is to become a part of the local municipal system in the city of Seattle, payable in fourth lien utility revenue bonds. A referendum was invoked soon after the purchase ordinance was enacted, and the Council's action must go to the people at the city election next March for ratification or rejection. Meantime, the citizens of the valley interested in the matter declare, real estate values are being held back because persons going into the valley on street cars have to pay 10 cents when they desire a transfer. D. W. Henderson, superintendent of the Seattle Municipal Railway, declares that $200,000 additional revenue would accrue to the department if it operated the valley line. It is also pointed out that the tracks on Fourth Avenue, now used exclusively by the valley line, are greatly needed in the downtown traffic system of the municipal railway.

Deficit on Interborough. — For the five months ending Nov. 30, 1926, the total revenue from all sources of the Interborough Rapid Transit Company, New York, N. Y., was $24,322,310, a decrease of $331,219 over the corresponding period of 1925. Expenditures for operating and maintaining the property increased $761,630. Taxes payable to the city, state and the United States increased $119,657. Rentals and other income deductions increased $36,120. The net results for the five months was a deficit of $1,292,097. This is $1,248,627 greater than the deficit for the corresponding period in 1925. The comparison with 1925 is influenced by the strike during the month of July, 1926, as well as the fact that in July, 1925, there was a lump sum payment of $770,000 on account of the new advertising contract, against which there was no similar payment this year.

Chicago Will Intervene

City Plans to File Petition in Chicago Railways Receivership—Mayor Insists Public Interests Be Protected

Alarm over the possible repudiation of the contract which insures the city of Chicago 55 per cent of the net earnings of the Chicago Surface Lines as a result of the receivership of the Chicago Railways evoked an immediate order from Mayor William E. Dever to Corporation Counsel Francis Busch to take whatever steps in this crisis were deemed necessary to protect the public interests.

Mayor Dever later seemed impressed with the sincerity of the receivers' statement that they would not take any action which would interfere with the present Surface Lines operation or tend to disrupt the existing contracts between the city and the companies as to unified operation, universal fares, paving and street cleaning obligations, etc.

City Attorney Busch subsequently announced his intention of filing before Jan. 1 an intervening petition with Federal Judge James C. Wilkerson, who appointed the three receivers, advising the court of the interests of the city in these features of the expiring franchises so that in event of proceedings relating to the receivership being started the city may be given a chance to present its side. Mr. Busch said:

> The order of the court directs the receivers to continue the Surface Lines' joint operating agreements, including a single fare over the entire system and universal transfers. Also it authorizes the receivers to seek instructions from the court in regard to negotiations with the other surface lines for continuance of a unified service after Feb. 1. But it says nothing about the contract rights of the city under the 1907 ordinances.

Picturing the situation as it will probably stand on Feb. 1, when the present franchises expire and the bonds fall due, Mr. Busch said:

> Of course the cars will be running, either with some agreement or without. The courses left open at the expiration of the 1907 ordinances 45 days from now are set up in the franchise as follows:
>
> 1. The city may buy the lines. But the city hasn't got the price.
> 2. The city can designate a purchaser to which the companies must sell the properties on the same terms upon which the city might purchase. This is, if such a sale is after Feb. 1. If before Feb. 1, 10 per cent is required to be added to the purchase price. The Lisman plan comes under this possible procedure.
> 3. The city can stop the running of the surface cars and decide to put on some other vehicle of transportation. The proposal of the Chicago Motor Coach Company to substitute buses for the trolley cars comes under this.
> 4. The city can grant a franchise to the companies, not exceeding twenty years. The proposed six months extension of the expiring contract ordinance comes under this. Or an ordinance could be passed subject to a referendum of the people of Chicago, subject to subsequent legislation modifying the twenty-year limitation.
>
> If Feb. 1 comes without a six months extension the city could pass an ordinance allowing the cars to run from day to day subject to cancellation, or it could do nothing at all but let the cars run on suffrance. So far as concerns the west and north side lines under receivership, it would be up to the court to determine whether the city's rights, such as the 55 per cent of the income, the paving of the street car lines, and the street cleaning, should continue, while with the other companies it would be a matter of voluntary contract.
>
> Then the question of acquired rights might enter. In cases in other states, it has always been claimed that by letting them run some rights are acquired by the companies. So it is far better to have a definite stipulation such as a six months extension of the present franchises would give. We hold no rights are acquired in any event.

Chairman Joseph B. McDonough of the local transportation committee pretended to see in the receivership "just another crack at home rule." He said that "the north side lines want to gum things up and deal with the State Legislature instead of with the City Council."

In the opinion of Alderman Jacob M. Arvey, administration leader in the City Council, the receivership of the Chicago Railways has reacted in favor of the plan of the F. J. Lisman interests of New York for the settlement of the traction problem. This plan, in the form of a tentative ordinance, is now before the local transportation committee.

Wage Increase Alone Outstrips Increased Fare Earnings

Increases in rates of fare between 1915 and 1925 from 5 cents to 7 cents, and in some cases even 8 cents or 10 cents, and an increase of 3 per cent in revenue passengers carried during that ten-year period were not sufficient by $268,000 to permit the sixteen electric railways in Missouri to meet increases in wages alone for the same period, although operating expenses, other than wages and taxes, were reduced $2,179,063 in 1925 under 1915, according to a statement made by the Missouri Committee on Public Information.

The survey covered all sixteen electric railways in the state. The data contained in it were taken from reports made by the companies to the Public Service Commission.

Comparisons brought out in the summarized figures for the two years are contained in the accompanying table.

Item	Year 1915	Year 1925	Increase 1925 Over 1915	Per Cent Increase
Total operating revenue	$21,631,634	$30,565,527	$8,933,893	41.2
Total operating expenses	14,483,464	22,479,257	7,995,793	56.1
Net operating revenue	7,148,170	8,086,270	938,100	13.1
Total wages paid	7,022,809	16,224,408	9,201,599	131.0
Total taxes paid	1,464,633	2,437,790	973,157	86.5
Other operating expenses	5,996,022	3,816,959	(2,179,063)*	36.3*
Average number of employees	9,339	10,035	696	7.5
Average annual wage	752	1,617	865	114.0
Wages to total expenses, per cent	48.6	72.5	23.9	49.2
Taxes to total expenses, per cent	10.1	10.8	0.7	6.9
Total fixed capital investment	188,260,986	183,417,494	(4,843,492)*	2.6*
Net revenue in per cent fixed capital	3.8	4.25	0.45	11.8

* Decrease.

"Due to the increased cost of living the increase of wages paid were, no doubt, fully warranted," the committee states, "but it is apparent that the fare charges did not permit, in 1925, a proper return over and above increased wages and taxes, even though the economies and improvements effected in all other operating costs, and in the service generally, produced a reduction in operating expenses of $2,179,063, or 36 per cent during this ten-year period."

The increase in total revenue of $8,934,000 was insufficient by $268,000 to meet the increase of wages alone of $9,202,000 during that period, while increases in taxes added a further deficit of $973,000 during the same period.

Diminishing Traffic Forces Indiana Line to Cut Service

The Hammond, Whiting & East Chicago Railway, which operates approximately 33 miles of track in the city of Chicago and adjoining communities in Lake County, Ind., has announced its intention to reduce service on the line between Hammond and East Chicago, Ind. This line has been making a valiant fight against jitney and motor coach competition for several years, but riding has become so light the company is compelled either to alter the service or suspend operations altogether. The present ten-minute service during morning and evening rush hours will be maintained, but during the rest of the day the present twenty-minute service will be cut to a car every hour.

According to Charles E. Lawrence, general manager of the road, riding fell off sharply five years ago when the streets of Hammond were swarming with jitneys and for a time the company could not make expenses. Conditions improved slightly after jitneys were ruled from the streets and an orderly motor coach service was installed, but by no means approached the old pre-jitney status. Most of the day's business is done during the morning and evening shifts at local industries, with a slight pick-up around noon. Mr. Lawrence believes that by cutting down off-peak service the company can minimize costs without any appreciable decrease in gross business.

Hearing on Abandonment Concluded

Hearing upon that part of the petition of the Hudson Valley Railway for permission to abandon the Lake George-Warrensburg part of its road was closed before the Public Service Commission recently and James McPhillips of Glens Falls, representing the company, and James E. Kiley, also of Glens Falls, representing the town of Warrensburg, were given three weeks in which to file briefs. Evidence by officials of the electric railways was to the effect that the Delaware & Hudson Company's last dividend was 9 per cent; that the controlling interest in the Hudson Valley Railway was held by the United Traction Company, and that controlling interest in the latter was held by the Delaware & Hudson Company. J. King Gillingham, an employee of the electric railway, said that with slight replacements the track of the railway would be in fairly good condition. Final hearing was also held on the company's petition for abandonment of that portion of its line between Thompson and Greenwich.

Legal Notes

ALABAMA.—*Ejection of Passenger After Time Limit on Transfer Ticket Has Expired.*

A passenger who attempted to ride on a transfer ticket whose time limit had expired was ejected, without unnecessary violence, by the conductor. He claimed that he had been unable to secure passage upon any car passing the given point within the life of the transfer. It was held that this failure did not entitle him to ride on an expired transfer and he could not sue for wrongful eviction. His remedy was to sue for the negligence of the company in issuing an improper transfer or in failing to furnish cars on which the transfer might have been used within its time limit. [Birmingham Electric Co. vs. Putnam, 109 Southern Rep., 890.]

ILLINOIS.—*Application for Relocation of Railroad Should Prove Convenience and Necessity for Road Actually Giving Service.*

The North Shore Connecting Railroad was organized by the Chicago, North Shore & Milwaukee Railroad to unite two existing sections of its line by a cut-off which would eliminate the necessity of the latter road operating over certain city streets in Evanston. Its petition for right to build this line was granted by the Illinois Commerce Commission, but the action of the commission was reversed by the Illinois Supreme Court on the ground that the North Shore Connecting Railroad itself was not authorized to serve the public by operating trains and that it could not remove the tracks now on the city streets in Evanston. The proper method for securing the change would be for the operating railroad in its own name to petition the Commission for relocation and to prove that the relocation would serve the public interest. [Roy et al., vs. Illinois Commerce Commission, 153 Northeast. Rep., 648.]

MONTANA. — *Legal Speed of Cars Changed by Ordinance.*

A city council passed an ordinance permitting trolley cars to operate at a higher speed than was originally allowed in the company's franchise. After an accident, the plaintiff charged that the trolley car was running at a higher speed than was permitted in the franchise, but as this speed was not greater than that allowed by the ordinance, the latter was held to be controlling and the company was not responsible. [Varn vs. Butte Electric Railway, 249 Pacific Rep., 1070.]

OHIO.—*Low Revenue of Traction Company Should Be Considered in Grant of Parallel Route.*

The East End Traction Company protested against the grant of a motor bus franchise in the territory served by it, and proved that it had made no net revenue over operating expenses and taxes for the previous five years. The Public Utilities Commission should have given some consideration to this fact, in so far as the depletion of the company's revenue might necessitate a further abandonment of the traction line altogether. Hence, the grant of the motor bus franchise by the commission was reversed. [East End Traction Co. vs. Public Utilities Commission, 152 Northeast. Rep., 20.]

NEW JERSEY.—*Collision of Automobile with Pillar of Elevated Railway.*

A person driving an automobile at night collided with the pillar of an elevated railway structure, and brought suit against the company on the ground that the pillar was a nuisance and should be illuminated at night. The Court decided that as the elevated road was built pursuant to authority, it was not a nuisance and the public must take note of the presence of the pillar in the street, and in the absence of any requirement by statute or ordinance requiring illumination, the railroad was not obliged to illuminate them. [Lorentz vs. Public Service Railway, 134 Atlantic Rep., 818.]

NEW YORK.—*Bus Franchises Upheld.*

An injunction restraining the city of Yonkers from awarding certain franchises or consent for the operation of motor bus routes was denied in spite of various objections raised by the Yonkers Railway Company, including the following: That the Board of Estimate should approve the grant, that all bidders were asked to waive objections to the reasonableness or legality of any provisions of the contract, that at the expiration of the franchise there could be renewal for ten years under certain conditions, that the city may take over the franchises for municipal operation, that certain clauses provide for summary forfeiture of the franchise without recourse to proceedings at law or equity and that approval must be received from the Public Service Commission. [Yonkers Railways vs. City of Yonkers, 217 N. Y. Supp., 686.]

OREGON. — *Power of Public Service Commission over Carriers.*

In 1921 the state passed an act regulating motor vehicles operated for compensation over public highways, defining what constitutes transportation, compensation and transportation companies. A section of the act forbids any concern, as defined in the act, to operate any motor vehicle for transportation of person or property, for compensation, on any public highway of the state, without first having obtained a permit from the Public Service Commission but authorizes the commission to exempt from the operation of the act the transportation of freight or passengers by motor vehicles in rural communitites if not done on a commercial basis. The court held that on the basis of a reasonable classification in the exercise of the police power, the legislature may regulate the use of highways and may even forbid the use of them for some purposes, but in the present act there is nothing in the statute relating to the use of the highways. The commission is given arbitrary power to apply the act when and where it will be governed only by its own discretion. Hence, the commission was enjoined against interfering with the business of the defendants. [Purple Truck Garage Co. et al., vs. Public Service Commission. 250 Pacific Rep., 213.]

PENNSYLVANIA. — *Municipal Railway Property Taxable.*

The city of Philadelphia built an elevated railway on Frankford Avenue and a surface line to Bustleton and leased them to the Philadelphia Rapid Transit Company for five years at a fixed rental. A tax assessment in favor of the Commonwealth against the Philadelphia Rapid Transit Company for these properties was upheld on the ground that the property of a municipality used for purely private purposes is not exempted from tax, although that used for governmental purposes is not taxable. [Commonwealth vs. Philadelphia R. T. Co., 134 Atlantic Rep., 452.]

RHODE ISLAND.—*Right-of-Way at Street Intersections.*

The driver of a carriage or automobile, proceeding at a reasonable speed, who reaches a street intersection in time to go safely across the tracks in advance of an approaching car, has the right-of-way. Hence, a railway company was held responsible when its trolley car ran into an automobile which became stalled on the track while trying to cross when the electric car was about 100 feet away. [Hassam vs. United Electric Railways, 135 Atlantic Rep., 36.]

TEXAS.—*Duties of Street Railway to Keep Boarding Places for Cars in Good Condition.*

The charge by the trial court, that it is the duty of a common carrier to maintain a boarding place or platform "in a reasonably safe condition and repair," places upon it greater responsibility than the law requires. For all accidents occurring at a boarding or alighting place outside of the area which the railway company was required by law to keep in repair, it was not responsible. [Eastern Texas Elec. Co. vs. Tucker. 287 Southwest Rep., 71.]

WASHINGTON.—*Test of a "Public Carrier."*

The state sought to recover penalties because the defendants (a tug and barge company) did not charge for services rendered by it in accordance with the tariff on file with the Department of Public Works. It claimed to be a private carrier and, therefore, not bound by the tariff rates. The court held that a common carrier is one whose occupation is the transportation of persons or things from place to place for hire or reward and is willing to serve the public indiscriminately in the lines or departments in which he is engaged. The fact that a company has no fixed schedule of rates and reserves the right to refuse to give service whether its vehicle is engaged or not, is immaterial; its character is determined by its public profession. [State vs. Washington Tug & Barge Co., 250 Pacific Rep., 49.]

Personal Items

Lionel J. Bourke Promoted in Seattle

Lionel J. Bourke, secretary to William H. McGrath, vice-president of the Puget Sound Power & Light Company, Seattle, Wash., has just been appointed assistant to the vice-president. In the same year that he was graduated from the Texas Agricultural & Mechanical College, namely, in July, 1922, he entered the employ of the Stone & Webster Company, Boston, Mass. The following March he joined the Puget Sound Power & Light Company as a student engineer and was appointed resident manager at Elma, Wash. He was appointed secretary to Mr. McGrath in the executive offices in Seattle on Dec. 1, 1924.

L. J. Bourke

Mr. Bourke, the new assistant, was born at Yoakum, Tex., Feb. 19, 1900. At the Texas Agricultural and Mechanical College he took a B.S. degree in electrical engineering.

Personnel Changes in New York Companies

Further changes are announced in the personnel of the New York Railways and the Fifth Avenue Coach Company, New York, N. Y., the operating organizations of which are now more closely affiliated. Appointments made by the New York Railways effective Jan. 1, 1927, are as follows:

Henry J. Smith is made general attorney, reporting to the president, vice R. B. Hull, resigned.

F. B. Gordon, in addition to his present duties as secretary of the corporation, will take over the duties of treasurer, reporting to the president, vice J. S. Dunham, treasurer, transferred to the law department.

T. G. Walker is appointed assistant secretary and assistant treasurer.

Joseph A. Clair is appointed claim agent, reporting to the general attorney.

C. A. Wittcke is appointed assistant purchasing agent, reporting to the vice-president.

Changes made by the Fifth Avenue Coach Company effective Jan. 1, 1927, are as follows:

Henry D. Cruger has submitted his resignation as auditor. He will be retained in a consulting capacity.

George V. Owen is appointed auditor, reporting to the president.

Worthington G. Strait is appointed purchasing agent, reporting to the vice-president and general manager.

C. A. Wittcke is appointed assistant purchasing agent, reporting to the purchasing agent.

Mention was made in the ELECTRIC RAILWAY JOURNAL for Dec. 25, 1926, of the election of officers of the Fifth Avenue Coach Company to the board of directors of the New York Railways.

James Dalrymple—Tramway Internationalist

The Scotsman Who Held True to the Trust Reposed in Him—To Act as Consultant

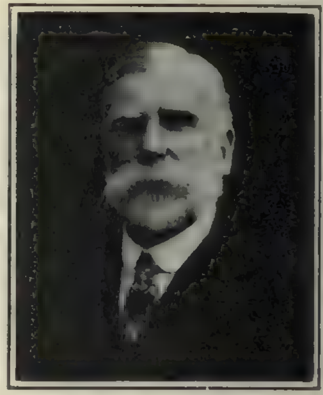
James Dalrymple retires as of Jan. 1. Those who have known only the achievements of Mr. Dalrymple as tramways manager must have often wondered why an operator of world-wide reputation remained in Glasgow for 46 years when much more tempting positions had been open to him for a generation, but those who know James Dalrymple the man realize that loyalty to an ideal meant far more to him than money.

That ideal was, first, to give Glasgow a transport system that would stand forth to the world as the best of its kind and then to retain that reputation for the city. It was not until changing political conditions threatened to make continuance of this ideal impossible that James Dalrymple resigned.

Even those who follow British politics only slightly must be aware of the new alignments that are taking place. Since the rise of the Labor party, the old principles in municipal operation of utilities seem to be going by the board. With the middle-class parties in power, municipal tramways frankly were run on business principles in the expectation that their profits would go toward the reduction of taxes. With the Labor party in power, the tendency is toward making the service so cheap for the user that, if necessary, taxes are raised instead of lowered. The workingman sees only the direct personal charge of the fare, and does not see the inevitable but indirect charge of an inadequate fare reflected in higher rent and other living costs due to higher taxation.

To practical, conscientious men of the Dalrymple type, this change of attitude on the part of the councils to whom they report is most disturbing. They do not want to retain their jobs at the sacrifice of principle. In Mr. Dalrymple's case, the matter of fares was not the immediate issue, although that question was always in the background. It was a matter of asking him to break his word that strikers who failed to return by a given day would not be restored to their positions at the expense of those who replaced them. When Mr. Dalrymple stood upon his disciplinary powers as manager with an "M," the Council indorsed his opposition to the tramways committee and asked him to withdraw his resignation. This he declined to do, offering his resignation as of Dec. 31, 1926, with no prejudice to his well-earned rights for superannuation pay.

But James Dalrymple is far from superannuated. His keen Scotch brain is brighter than ever. Even in earlier days, when it was no easy task to borrow him from Glasgow, his services as a consultant were sought far and wide. Perhaps his most famous consultation was that for Mayor Dunne of Chicago in 1905. When the Chicago Mayor refused to make public the outcome of Mr. Dalrymple's widely heralded study, on the plea that it was a private report, the Glasgow Council properly insisted that Mr. Dalrymple had been loaned only as a courtesy to the people of Chicago and not to an individual. The people were entitled to know Mr. Dalrymple's conclusions. Whereupon the whole report was printed as a portion of the Council's minutes.



James Dalrymple

This report contained a letter, dated June 29, 1905, from Mr. Dalrymple to Mayor Dunne, in which occurred the bluntly honest passage that had been found so distasteful, viz.

> There would undoubtedly be a very grave danger in your city attempting to operate what would be the largest street railway undertaking in the world without making a very radical change in the methods usually employed in carrying on municipal work by the cities of the United States.

Tableau!

In all likelihood, Mr. Dalrymple will continue his globe-encircling consultations on a larger scale than has been practicable heretofore. Within the last two years he went to Bombay, India, and now São Paulo, Brazil, has put in a call for him. Glasgow has lost James Dalrymple through class politics, but the transport world at large has won him for still greater triumphs.

Changes in Day & Zimmermann

Well-Known Firm Honors Three Employees Who Have Risen from the Ranks—Distinction for Two Executives

A recent move by Day & Zimmermann, Inc., an engineering and management corporation, has resulted in the promotion of five employees, two of whom are executives and the three others promoted from the ranks. Charles Day, president, becomes chairman of the board of directors; John E. Zimmermann, vice-president, becomes president. Three long-term employees assume the duties of vice-president; they are Floyd W. Woodcock, in charge of public utility management; Col. E. M. Chance, in charge of the engineering and construction work, and W. Finlay Downs, who is in charge of engineering reports and valuations of utilities and industrials. All three were placed on the board about two years ago. These changes are noteworthy in that this firm has not only managed and operated many utility properties, including railways, for its own account but also has participated in the management and reorganization of properties for others.

Charles Day, the new chairman of the board, is one of the country's foremost engineers and business advisers. His early career included participation in the introduction of scientific management with the Link Belt Company. Under the firm name of Dodge & Day he then offered to industry, as a consultant, the experience that he had acquired. He specialized in the introduction of mechanical equipment. This led him to engage in the planning and construction of industrial plants, then the construction of electric properties, railways and transmission lines. Mr. Dodge withdrew in 1911 and the firm became Day & Zimmermann. In rapid sequence the firm's activities were extended to embrace the management of public utilities and industries and the scope of its investigation and report work was broadened to embrace not only the mechanical and operating problems, but those concerned with financial matters as well.

MANY ACTIVITIES DURING THE WAR

His services during the war were readily accepted by the government and he became affiliated with the general munitions board and of the depot board of the War Department; he served on an observation committee and on the shipping board. He visited all ports, storage and terminal facilities and lines of communication reached by American forces and reported on the adequacy of these facilities. He lectured for many years in special courses at the Graduate School of Business Administration in Harvard University and Columbia and Lehigh on the planning and building of industrial plants. His interest in his alma mater led him to accept the trusteeship of the University of Pennsylvania and he has been actively engaged on various phases of the work of that busy board. In addition he has served as director and officer in many of the public utilities managed by his company and on the boards of the Interborough Rapid Transit Company of New York, Pennsylvania Railroad and the Fidelity-Philadelphia Trust Company.

His associate, John Edward Zimmermann, was for a time surveyor on the Pacific Railroad and superintendent in the Great Southern Railroad shops in the Argentine Republic. In 1907 he became a member of the engineering organization now known as Day & Zimmermann, Inc., Philadelphia, of which he became vice-president. He has participated actively in the construction work of the company, but his most valuable contribution to the firm's success and the one for which he is best known in the business world is his contribution to public utility management. This branch of the company's activities was under his direct supervision. It now embraces, among other projects, the electric light and power, bus, electric railway and refrigeration properties in eight states, serving more than 100 communities and many of the most prominent industries of the Eastern states. Under his guidance these facilities have been developed physically and economically and extended to meet changing conditions. Mr. Zimmermann is a member of the American Society of Mechanical Engineers, American Institute of Electrical Engineers, Franklin Institute, Pennsylvania Historical Society, Pennsylvania Museum and School of Industrial Arts.

F. W. WOODCOCK'S RAPID RISE

Floyd W. Woodcock is one of the new vice-presidents. He rose from messenger and general utility clerk in the home office in 1908 to manager of the public utility management department and right-hand man to Mr. Zimmermann in 1922. He has learned the business from the ground up. When the first management job went into the office Mr. Woodcock followed Mr. Zimmermann's work and methods. When Mr. Day began to apply the principles of scientific management to public utilities he gave close attention to that, too. He firmly made up his mind what he wanted to do and prepared for it by studying electrical engineering at Drexel Institute at night. Afterward, when a definite, responsible assignment was intrusted to him, he installed the company's system of classification and of records and store keeping and planning on the Penn Central property and later extended it to others.

In this way he became a sort of general "trouble" man and was shifted from one place to another to combat disagreeable and difficult jobs. All through these years he kept on with his engineering studies, getting the practical application of the principles in his daily contact with construction and operation in the field. Then the Eastern Shore properties needed a general superintendent and he was given the chance to put into practice all the experience he had obtained. He studied the personnel available for a successor to himself. Thus it was that when Mr. Zimmermann decided that for his own relief and the good of the service he would bring Mr. Woodcock from the home office another was ready to step into his position.

Col. Edwin M. Chance, another of the new vice-presidents, was a chemist and engineer with the Reading Coal & Iron Company and consulting engineer for a group of coal mining industries before the war. In 1917 he was commissioned captain by the Ordnance Department, charged with the responsibility of filling shells with poison gas. He designed and built the plant at Gun Powder Neck in Maryland known as the Edgewood Arsenal. The total cost of the plant was about $38,000,000. Over this plant he had complete charge. The Edgewood Arsenal supplied not only the gas for filling American shells, but shipped great quantities of bulk gas to France and Great Britain to supplement their production. Colonel Chance was in charge of all design and construction work and later was in charge of operations.

W. FINDLAY DOWNS CONSPICUOUS IN VALUATION WORK

W. Findlay Downs, the third newly appointed vice-president, started his career doing forestry service in the Maine woods. Later he became affiliated with the United Construction Improvement Company, Philadelphia, as an engineer. His activities include service with J. G. White Engineering Corporation, assistant engineer of the Pennsylvania Public Service Commission and valuation work with the New York Telephone Company. With Day & Zimmermann he was engaged in valuation of utilities and industrials.

F. C. Lynch Heads Kansas City Safety Council

F. C. Lynch, superintendent of bus maintenance of the Kansas City Public Service Company, Kansas City, Mo., has been elected director of the Kansas City Safety Council by the executive committee of that organization, succeeding Julien Harvey, former director, who resigned to become affiliated with the National Safety Council in Chicago.

Mr. Lynch, better known to his friends and associates as "Mike," entered the service of the Kansas City Railways, predecessor of the Kansas City Public Service Company, on Sept. 20, 1922. His duties with the Kansas City Railways brought him in close touch with safety matters and he has been prominent in the activities of the Kansas City Safety Council.

Obituary

E. M. Walker

Edwin M. Walker, president of the Schenectady Railway, Schenectady, N. Y., died very suddenly on the morning of Dec. 30 of a heart attack suffered as he was attending to his automobile in his own garage.

Mr. Walker had been at Schenectady as president since September, 1923. Before that he had, since 1917, been general manager of the Terre Haute division of the Terre Haute, Indianapolis & Eastern Traction Company. He was born at Workshop, England, in 1875, but was educated in the United States.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Extensive Equipment Exhibit for American Road Builders

Final arrangements have been completed for the annual convention and road show of the American Road Builders' Association, which is to be held in the coliseum at Chicago, Jan. 10 to 14, 1927.

Already more than 300 carloads of machinery and materials have been arranged for display. More manufacturers have applied for space this year than ever before, which necessitated extra space being acquired in the Wilson Building, adjacent to the coliseum. The exhibit of the United States Bureau of Public Roads will depict all conditions in the road field and finally finish with an exhibit by a mythical Highway Commission of Utopia.

As the convention is coincident with Good Roads Week, officials of the association have made elaborate plans for speakers. They have also invited the Governors of all the states in the Union to appear. Former state executives who were especially active in sponsoring a highway program have been invited, as have leading road promoters from foreign countries.

General Electric Reviews Activities During 1926

Scheduled for distribution Jan. 1, the General Electric Company announces that the annual review of its activities in the electric railway field has been prepared by W. B. Bearce of the railway engineering department.

An advance copy reveals that Mr. Bearce, in addition to making a comprehensive résumé of the developments in the railway field, has reviewed at some length the progress of and results obtained from railroad electrification, giving generous space to the work undertaken by the Anglo-Chilean Consolidated Nitrate Corporation, Tocopilla, Chile; the Great Northern, Illinois Central, New York Central, New York, New Haven & Hartford and Pennsylvania systems.

Under this subject are included some figures which were the result of a study made by the Spanish Northern Railway with respect to the merits of steam and electric locomotives on the Pajaras grade, where the larger portion of the tonnage is hauled in an up-grade direction.

Incidentally these figures show a 55 per cent saving in the cost of electric power as compared to coal, a reduction of 47 per cent in the number of engine-miles for the same traffic handled, 73½ per cent saving in the cost of repairs and upkeep for locomotives, a saving of 63 per cent in crew expense and a reduction of 31 per cent in the cost of moving a ton-kilometer of freight.

The author also gives some interesting sidelights on oil and gas-electric motive power, railway substations and mercury arc power rectifiers.

Coincident with the appearance of this review the company has released a 38-section article by John Liston on "Some Developments in the Electric Industry During 1926," several sections of which are devoted to pertinent subjects in the electric railway field. Numerous illustrations add interest to both releases.

Westinghouse Achievements Outlined in Year Book

Engineering achievements of the Westinghouse Electric & Manufacturing Company for the past year are attractively set forth in a 42-page booklet by H. W. Cope, assistant director of engineering. The publication, which covers a wide range of subjects, is expected from the press in about three weeks.

In the opinion of the author, the outstanding contribution of his company to the light traction field was the dual ventilation for railway motors, a problem that was only solved after lengthy and extensive tests which definitely determined that dust and sand carried by the ventilating air in previous models was the sole cause of excessive brush and commutator wear.

To obviate this trouble, there has been perfected a dual ventilating system which retains all of the advantages of the ventilated type and in addition practically secures the brush and commutator life of the non-ventilated motor. As a result, where sand conditions are serious, brush and commutator life has been more than quadrupled.

In the new design the armature and fields are separately ventilated and the ventilating air for each is kept out of the commutator space by means of baffles. The exclusion of the air from the commutator space keeps out the dust.

Other subjects discussed of interest to the field are: Gas-electric equipment, buses, current collection, railroad electrification, circuit breaker tests, railway motor test dynamometers, electric welding, controls, etc.

Mr. Cope also gives a very interesting description of the system for ventilating the Holland vehicular tunnels under the Hudson River.

Metal, Coal and Material Prices

Metals—New York	Dec. 28, 1926
Copper, electrolytic, cents per lb.	13.20
Copper wire, cents per lb.	15.50
Lead, cents per lb.	7.80
Zinc, cents per lb.	7.35
Tin, Straits, cents per lb.	66.25
Bituminous coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$5.275
Somerset mine run, Boston, net tons	2.75
Pittsburgh mine run, Pittsburgh, net tons	2.125
Franklin, Ill., screenings, Chicago, net tons	1.75
Central, Ill., screenings, Chicago, net tons	1.375
Kansas screenings, Kansas City, net tons	2.325
Materials	
Rubber-covered wire, N. Y., No. 14 per 1,000 ft.	$6.00
Weatherproof wire base, N.Y., cents per lb.	17.00
Cement, Chicago net prices, without bags	2.10
Linseed oil (5-bbl. lots), N. Y., cents per lb.	11.3
White lead in oil (100-lb. keg), N. Y., cents per lb.	14.50
Turpentine (bbl. lots), N. Y., per gal.	$0.88

Large Orders for Buses Soon to Be Placed in New York

Some idea as to the extent of the orders for buses and equipment incident to the pending franchises now before the Board of Estimate and the Mayor of New York city may be gained from the fact that the Equitable Coach Company may operate 352 buses in Manhattan, 224 in Brooklyn and 196 in Queens, for which purpose it expects to invest about $20,000,000 in equipment.

In addition to this it is reported that the Surface Transportation Company, which may operate 81 buses in the Bronx, contemplates an investment of $1,500,000. Should the Manhattan Surface Coach Company succeed in wresting from the Equitable company the franchise rights for the Borough of Manhattan its bus requirements will exceed 300 units.

It is understood that the buses for the Equitable company are to be built by the American Car & Foundry Company or its subsidiaries. The Equitable Coach Company is sponsored by J. G. White & Company, Inc., New York; the Surface Transportation Company by the Third Avenue Railway, and the Manhattan Surface Coach Company, Inc., by the New York Railways.

Incidentally, the proposed awards have met with strong opposition from subway officials.

General Electric Names Three New Commercial Vice-Presidents

Three district managers of the General Electric Company were elected commercial vice-presidents at a meeting of the board of directors in New York on Dec. 30. The men thus signally honored were Theodore Beran of the New York district, J. A. Cranston of the Pacific Coast district and H. L. Monroe of the Chicago district.

The newly elected vice-presidents will continue their supervision of the commercial activities of the company in their respective districts.

Track and Line

Memphis Street Railway, Memphis, Tenn., will likely extend its Jackson Avenue line from Watkins Street to University Place by 1928, if plans promulgated by the city are carried out. Active efforts to that end have been promised by Mayor Rowlett Paine and Commissioner Horace Johnson with a committee representing the property owners along the 2-mile route.

Modern One-Man Cars in Nation's Capital also equipped with

Peacock Staffless Brakes!

In rendering "real street railway service" to the citizens of the Nation's Capital, the Washington Railway & Electric Company recently placed in service fifteen de luxe one man cars.

These cars are the last word in Modern car construction and practically every type of safety device has been incorporated in them with a view to demonstrating that one-man operation is fully as safe as two-man operation.

Naturally Peacock Staffless Brakes were chosen as part of this equipment.

We will be pleased to send full particulars of the many advantages which particularly adapt Peacock Staffless Brakes to the modern car—their light-weight—minimum platform space occupation—a chain winding capacity of 144 inches enabling them to develop maximum braking power under all conditions—etc. Write today.

National Brake Company, Inc.
890 Ellicott Square, Buffalo, N. Y.
Canadian Representative
Lyman Tube & Supply Co., Ltd., Montreal, Can.

For Modern Car Upholstery you can't do better than plush-

Plush-

if it's good plush will *outwear* other fabrics - - -

FIFTEEN YEARS of active railroad service is nothing unusual for Massachusetts genuine Mohair Plush.

Being a pile fabric, all the wear comes on the ends of the fibers instead of on the side as in the case of flat-woven materials. And in every square inch there are 50,000 of these fibers—each one separate, tough, springy and durable.

No other fabric is made this way. No other fabric has this naturally greater resistance to wear.

Massachusetts Mohair Plush not only lasts longer but *looks* better for a longer time. Dirt will not "grind" into it. It is almost all pile (or nap) and the pile is what gives the wear.

The newest patterns and colorings provide all you could want in luxurious practical upholstery for every type of service. Compare before making your specifications!

Patterns and quotations on request.

MASSACHUSETTS MOHAIR PLUSH CO.
Main Office
200 Devonshire Street, Boston, Mass.

Makers of BAY STATE PLUSH

New York Agent:
Sisson Supply Co.
1845 Grand Central Terminal.
New York City

Western Agent:
Midgley & Burowdale
1822 McCormick Building.
Chicago, Illinois

MASSACHUSETTS MOHAIR PLUSH

The railroad standard for over 35 years

Over the highway of progress

Pioneers and specialists in air brake development and manufacture since 1869.

With the passing of another year comes a new era of progress, of advancement in the field of motor coach transportation. Coach builders have forged ahead, overcoming modern obstacles with modern engineering prowess, into a new field of refinement.

To us, the coming of the new year means new responsibilities. Our appreciation of the modern retardation problems confronting motor transport builders has been reflected by their adoption of our equipment.

The illustration pictures a product of the American Car and Foundry Motors Company. A. C. and F. have accepted the Westinghouse Automotive Air Brake as standard equipment, enhancing the flexibility of the gas electric drive, which has marked their progressive step for the new year.

WESTINGHOUSE AIR BRAKE CO.
Automotive Division, Wilmerding, Pa.

6167

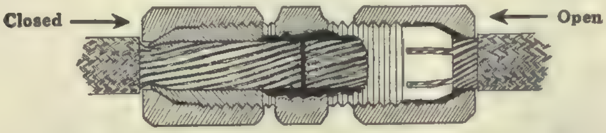
WESTINGHOUSE
AUTOMOTIVE AIR BRAKES

PATENTED

FRANKEL

SOLDERLESS CONNECTORS

for Solid, Stranded and Flexible Cables
Standard and Iron Pipe Size Tubings



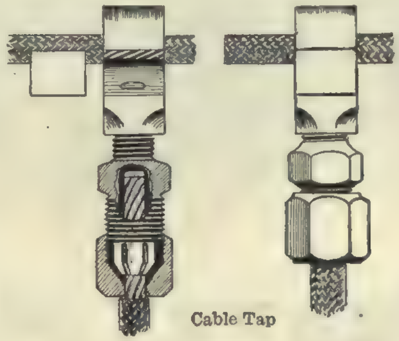
Sectional view of a Frankel Two-Way Connector showing one of the compression nuts in an open position and the other one closed, demonstrating how closely the conductor is gripped.

ELECTRICALLY Frankel Solderless Connectors will carry a full load with but 2° to 5° Centigrade temperature rise, as compared to the cable connected.

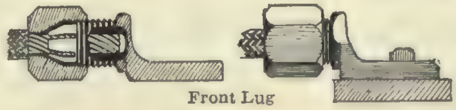
MECHANICALLY they will show no fatigue, holding both tensile strength and current carrying capacity for ∞. The standard connector will "pull" at approximately one-fourth the ultimate tensile strength of the cable.

TIME OF APPLICATION considered they require a minimum number of operations and a minimum amount of time to complete a joint.

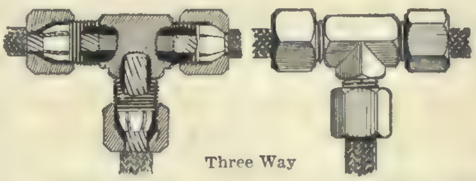
FRANKEL SOLDERLESS CONNECTORS will show a saving in labor and material, and are superior to the best type of soldered or mechanical connectors.



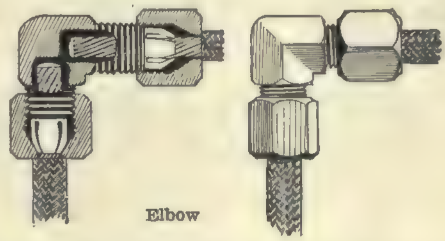
Cable Tap



Front Lug



Three Way



Elbow

APPROVED by the National Board of Fire Underwriters for all classes of wiring, Frankel Solderless Connectors eliminate the necessity for solder in making electrical connections and splices.

MADE FOR EVERY KIND OF CONNECTION—such as angle and swivel lugs, two-way and three-way connectors, stud connectors, equalizers, reducers, elbows, Y's, service box lugs and plugs, terminal and switchboard lugs (front or back connected), grounding devices, etc.

OUR ENGINEERING DEPARTMENT will gladly assist you in the selection or design of the types best suited to meet your requirements.

WRITE FOR OUR 1927 CATALOGUE NOW

FRANKEL CONNECTOR CO., Inc. MAKERS OF THE BEST ONLY FRANKEL CONNECTOR CO. INC N.Y. Cor. Hudson and Vestry Sts., New York

DISTRIBUTORS

Westinghouse Elec. & Mfg. Co. **Graybar Electric Company**

Sales Offices in All Principal Cities

Advancing a Great Public Service!

ONWARD moves the fine work of coordinated transportation.

From 16 electric railway companies operating motor buses in 1921 — the figure has advanced almost to 350 today!

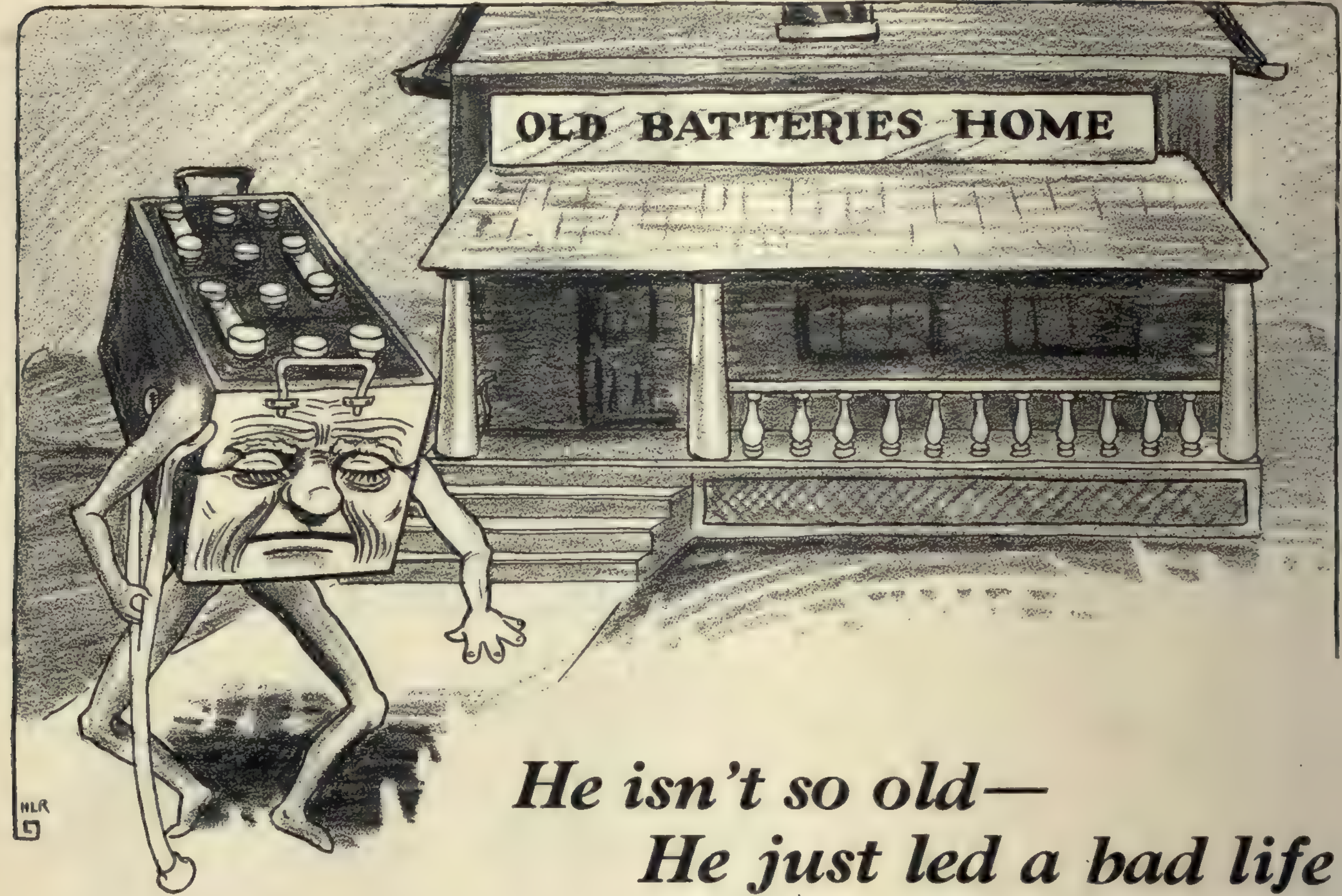
From 73 buses six years ago — the figure has grown to near 8,000 today!

Thus Electric Railway Management has demonstrated its foresight — and given the public the advantages of improved service — the simplification of traffic — the economies of unified administration.

It is significant that many leaders of this great movement are using Goodrich equipment — and the advance of Goodrich has outreached the advance of the industry!

THE B. F. GOODRICH RUBBER CO., Akron, Ohio
In Canada: Canadian Goodrich Company, Kitchener, Ontario

Goodrich
HEAVY DUTY
Silvertowns



He isn't so old—
He just led a bad life

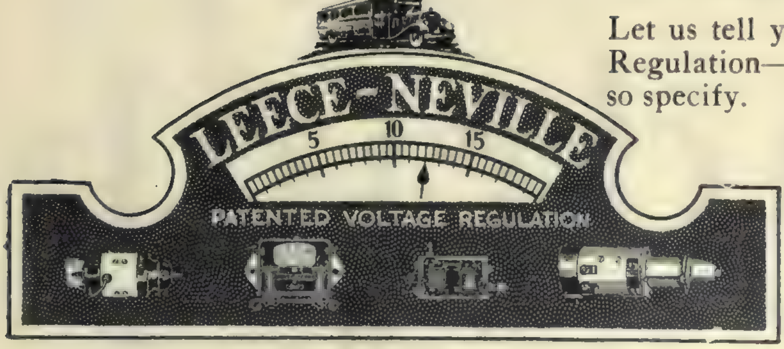
The dissipations of his youth broke him down, and made him old before his time.

But, poor duffer, it wasn't his fault—bad company—overcharge—undercharge—what battery could stand a life like that.

Now, he's no good for anything, and somebody has had to dig up the money to buy a new battery for his place.

Leece-Neville Patented Voltage Regulation discourages dissipation among young batteries. It keeps them from being broken down in youth—preserves them to a vigorous old age—many times the usual life for bus batteries.

Let us tell you more about Leece-Neville Patented Regulation—you can have it on any good bus if you so specify.



THE LEECE-NEVILLE CO.

5353 Hamilton Ave., Cleveland, Ohio

Just as in the Olden Days Lang Craftsmanship— has added charm and romance to the modern Bus!

Lang Craftsmen are graduates both of the old and the new schools, Out of their experience they have built into the modern motor coach the friendly goodwill, which won steady patronage for the stages of a past generation.

LANG BODIES

create new passengers

The entrance to a bus is the first impression that the passenger receives, . . . it is also the last to be carried away. A low step, a deep, draught-proof well, doors even a little wider than necessary, and a step spotlight, . . . such carefully planned details as these build patronage by leaving the right impression on passengers. People who ride once in a Lang Body invariably "ask for more."

Operators of buses with bodies by Lang know that this passenger attractiveness will last through years of gruelling service.

THE LANG BODY COMPANY
CLEVELAND, OHIO

A FEW OF
OUR PROMINENT
USERS

- Northern Ohio Power & Light Co.
- New England Company
- P.R.T. Co.
- Yelloway Co., Inc.
- Gary Street Rwy
- Yellow Cab Co., Montreal
- Capital Traction Co.
- Denver Rio Grande Interurban Line
- O. Townsend, Hastings, Nebr.
- White Star Transportation Co., Toronto
- North Texas Coach Co.
- Auto Tours, Los Angeles, Cal.

"After all— it's the Setting that counts!"

International Harvester
6-Cylinder Motor Coaches
are the product of one dominant idea—to give the coach route operator a quality vehicle at low cost. The idea is not uncommon but *the coach is.* It is built on a long, low, fast and sturdy chassis. It has attractive lines. Its inviting interior holds perfect comfort for 15 passengers in the Club Coach and for 17 in the Sedan-type Coach. The tremendous value at the outset is more and more apparent as the coach reaches big-figure mileage. Build patronage and profit with International Harvester 6-Cylinder Coaches.

INTERNATIONAL HARVESTER COMPANY
606 So. Michigan Ave. of America (*Incorporated*) Chicago, Ill.

INTERNATIONAL AUTOMOTIVE SERVICE *is rendered through* 125 COMPANY-OWNED BRANCHES

Nitro-Valspar Keeps Your Cars On the Road

TO refinish cars completely without losing a single hour from daily schedule service may *sound* fantastic. It's not only possible — it's being done, thanks to Nitro-Valspar, the fastest and finest of modern finishes. And it's being done not as a stunt or under specially favorable conditions, but as a matter of regular routine.

Here's the way the Calumet Motor Coach Company of Hammond, Ind., does it:

First Night: After the day's service is completed, coach enters finishing room, is washed and old finish is quickly removed. On the clean bare surfaces then is sprayed Nitro-Valspar Primer, which dries *hard* in 30 minutes. Successive coats of Nitro-Valspar Gunglaze are next sprayed on to build up the desired smooth surface. These coats, usually three in number, are applied as rapidly as spray-gun operator can work around the car and are dry in a few minutes. If needed the following morning, the coach is used in the Gunglaze coats for one day and returns to paint shop that evening.

Second Night: The coach is water-sanded and washed. After a half hour's drying to evaporate moisture, the three finishing coats of Nitro-Valspar Enamel are sprayed on as rapidly as operator can work around the body. The coach is again placed in service the following morning.

Third Night: Any desired striping and lettering is completed and the coach is ready for service next morning.

Thus no time at all is lost from schedule service.

This remarkable speed in finishing is feasible only with an *all*-Lacquer finish. As Nitro-Valspar is the only successful All-Lacquer System on the market today, it follows that no other finish can equal Nitro-Valspar in economy of time, labor and money.

NITRO-VALSPAR

The Valentine Lacquer Finish

VALENTINE & COMPANY • NEW YORK • CHICAGO • BOSTON

29-Passenger City Type, Mounted on Mack Chassis.

The "Duralyte" ALL METAL Body

After three years of successful operation on the Pacific Coast, increased production facilities permit us offering this unit for the consideration of manufacturers and operators nationally.

Built throughout of "Duralyte" (Aluminum Alloy). No Wood.

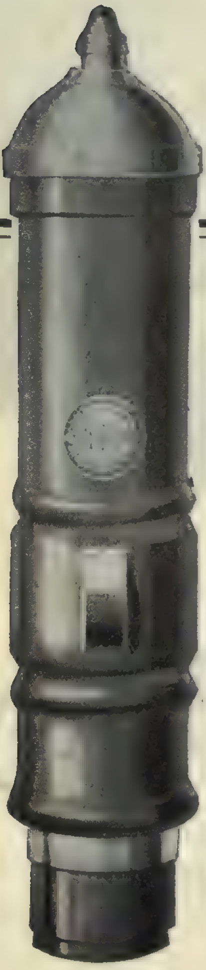
All Riveted Construction.

The Perfect All Metal Body Combining
Light Weight—Strength—
Long Life—Safety
Low Maintenance Cost.

Inquiries wired or mailed to us will have the immediate attention of our representative who is now visiting all the principal cities with a complete bus body.

General Aluminum Products Co.

OFFICES AND FACTORY, 4536 East District Boulevard, Los Angeles, California



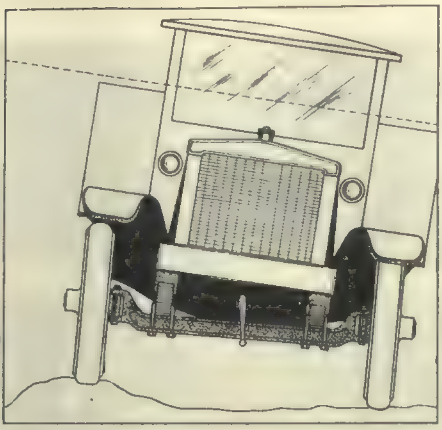


Figure 1, illustrating how chassis of truck not equipped with air springs, is wrenched and twisted.

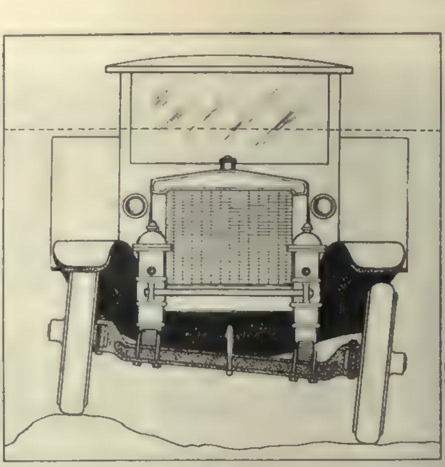


Figure 2, illustrating how air springs absorb the uneven road conditions and prevent wrenching and twisting of frame.

In Winter, Particularly,
Buses Need This Protection
Against Road Shocks and Vibration

THESE winter months are hard on buses. Frozen ruts and snow-piled roads make road conditions doubly brutal.

Protect your buses from these destructive shocks and the resultant vibration by equipping them with Gruss Air Springs.

Note the illustrations above. See how the Gruss air cushions absorb uneven road conditions and keep the chassis level. Mark how Gruss Air Springs protect the regular steel springs against the punishment they otherwise must undergo. Think of the maintenance saving you can effect by preventing steel spring breakage, alone.

Consider, too, the other benefits that air springs bring: Supreme riding comfort regardless of road conditions; maintenance of regular schedules—a score of other profit paying results.

You need Gruss Air Springs now. Write for complete details.

THE CLEVELAND PNEUMATIC TOOL CO.
Cleveland, Ohio

GRUSS AIR SPRINGS

for Trucks, Buses
Passenger Cars ~

Versare equipped with Waukesha "Ricardo Head" six cylinder engine

America's First Gas Propelled Street Car

When fully loaded with ninety-six passengers this bus and its load weighs over 31,000 pounds, yet the Waukesha 120 horsepower engine handles it with ease. Waukesha "Ricardo Head" engines are ideal for such heavy duty because of their unequalled economy, smooth running characteristics and longevity.

Power and economy are obtained from the "Ricardo Head" type of combustion chamber—smoothness from six cylinders, with a big crankshaft mounted in a rigid "Girder" type crankcase—longevity because the cylinders are fed with "Fresh Oil" and the bearings lubricated with constantly renewed oil. Write for "Six Cylinder" Bulletin describing this engine.

AUTOMOTIVE EQUIPMENT DIVISION

WAUKESHA MOTOR COMPANY

Waukesha **Wisconsin**

Eastern Sales Office *Aeolian Building, 33 W. 42nd Street* *New York City*

An INDIA Contribution to Tire Mileage

Photograph of a high grade, heavy gauge inner tube of standard make showing the results of heat from high speed service and from aging.

Heat and aging of inner tubes have been the greatest enemies of tire mileage.

High speed generates high heat which over-cures ordinary inner tubes—deadens them so they split, wear thru and puncture easily.

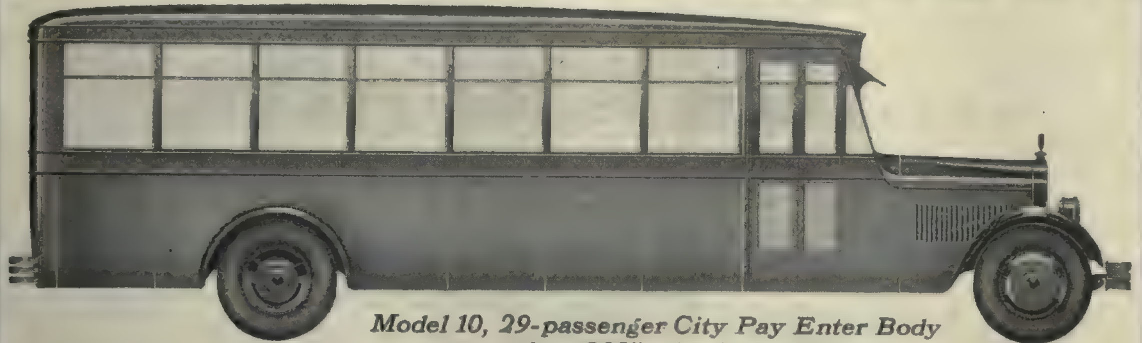
This is particularly true with balloon tires, as they are subjected continuously to extreme flexing action which burns up ordinary tubes faster than ever.

The India TRUE-BLUE (Heat-Proof) inner tube is the first to successfully overcome this condition. In a laboratory aging test, as used by leading tire manufacturers, the TRUE-BLUE tube was the only one, of a dozen makes, to retain its elasticity and tensile strength. All the others were easily broken with the fingers.

This is only one of the exclusive features which account for the long uninterrupted mileage INDIA tires are giving.

INDIA
TRUE BLUE
HEAT PROOF
INNER TUBES

INDIA TIRE & RUBBER CO., AKRON, OHIO.



Model 10, 29-passenger City Pay Enter Body mounted on 230″ wheel base chassis

(Detail specifications in bulletin 104-A, sent upon request)

THESE advertisements will feature, from month to month, bus bodies of standard types and sizes which are the product of the exceptional experience and facilities of this company.

THE BAKER-RAULANG COMPANY
Bus Body Division Cleveland, Ohio

Baker
Raulang
Bus Bodies

Bus wheels are BUDD-MICHELIN wheels

..... here is the evidence

FIVE YEARS AGO

the bus industry started on Budd-Michelin Dual Wheels

TODAY

...... all buses are on Budd-Michelins!

In an industry that is constantly changing and growing..... a wheel that has maintained undisputed leadership from the start, must be right!

BUDD

WHEEL COMPANY
Detroit

In Toronto Canada —

43

YELLOW COACHES

operate half a million miles without engine trouble

The Toronto Transportation Commission knows the meaning of successful motor coach performance.

"Half a million miles spread over eight months of service *without a single repair to* 43 *Yellow-Knight, 6-cylinder sleeve valve engines.*"

"That's performance," they say, and they should know because—

YELLOW KNIGHT

YELLOW COACHE

reserved by the

Toronto Transportation Commission for Deluxe and Special Service

—In one year, from August 31, 1925, to August 31, 1926, 43 Yellow Coaches carried 1,279,914 passengers on premier routes like the Hill Route, which operates on a fifteen-cent fare, and carries approximately 5,000 passengers daily.

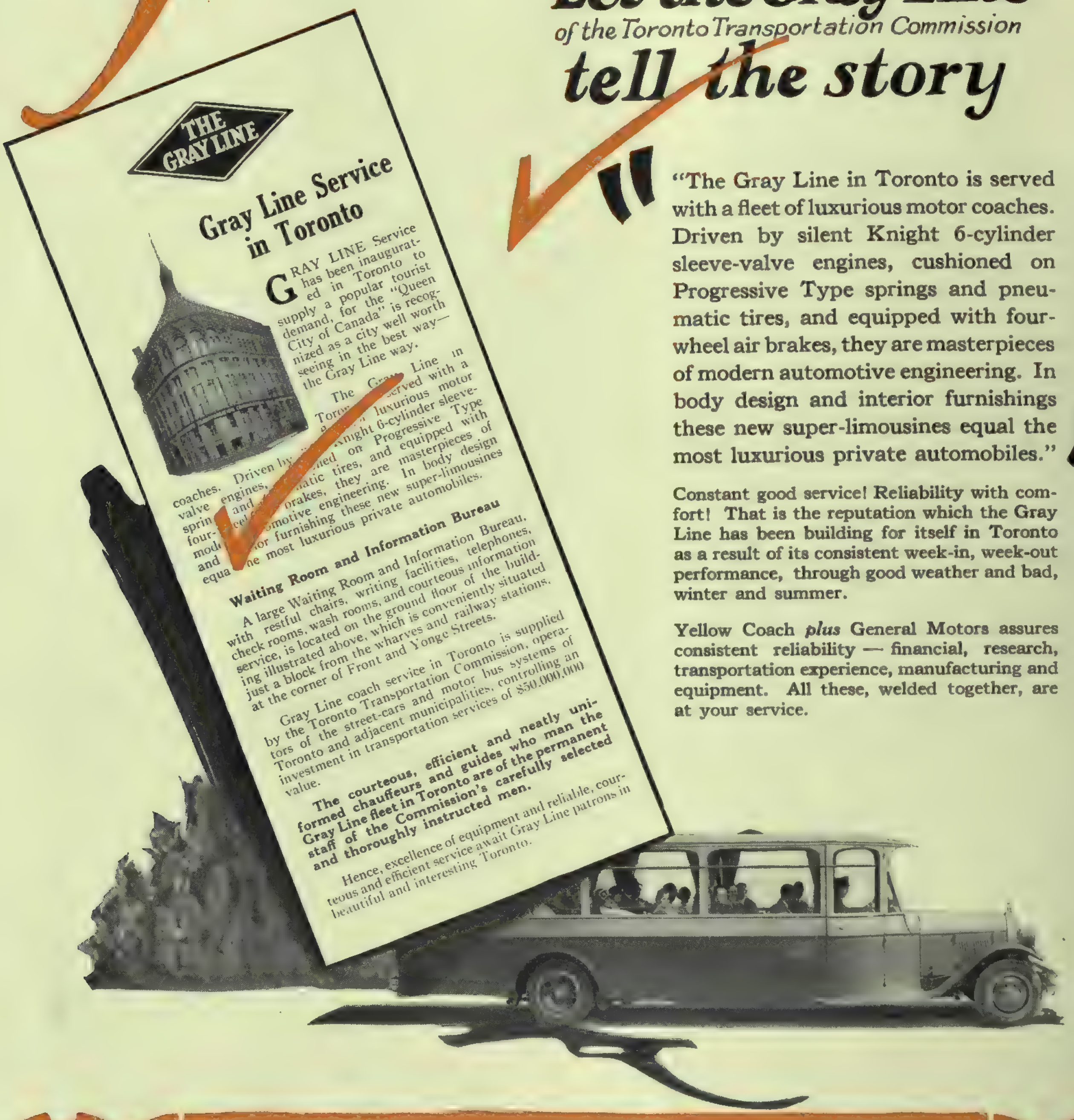
And on other critical residential routes, and for the famous Gray Line sightseeing service, Toronto-Niagara Falls-Buffalo service, special service to races, Orthopedic School service and for private charter service—there are Yellows—providing in each case the utmost in dependable service and in comfort.

The Toronto Transportation Commission has learned to rely on Yellow Coaches for those places where extreme luxury, comfort, safety and dependability are needed to successfully compete for high class patronage. Miscellaneous motor coaches of other makes are used on what the company calls "bus routes," but Yellow Coaches are reserved for De Luxe and Special service.

In Toronto, as in most of the cities of America, *Yellow Coaches* lead in attracting patronage, in low maintenance costs and in all-round transportation *satisfaction*.

YELLOW COACHES

Let the Gray Line
of the Toronto Transportation Commission
tell the story



THE GRAY LINE

Gray Line Service in Toronto

GRAY LINE Service has been inaugurated in Toronto to supply a popular tourist demand, for the "Queen City of Canada" is recognized as a city well worth seeing in the best way—the Gray Line way.

The Gra[illegible] Line in Toron[illegible] served with a [illegible] luxurious motor coaches. Driven by [illegible] Knight 6-cylinder sleeve-valve engines, [illegible]ed on Progressive Type sprin[illegible] and [illegible]matic tires, and equipped with four-[illegible] brakes, they are masterpieces of mode[illegible]motive engineering. In body design and [illegible]or furnishing these new super-limousines equa[illegible] the most luxurious private automobiles.

Waiting Room and Information Bureau

A large Waiting Room and Information Bureau, with restful chairs, writing facilities, telephones, check rooms, wash rooms, and courteous information service, is located on the ground floor of the building illustrated above, which is conveniently situated just a block from the wharves and railway stations, at the corner of Front and Yonge Streets.

Gray Line coach service in Toronto is supplied by the Toronto Transportation Commission, operators of the street-cars and motor bus systems of Toronto and adjacent municipalities, controlling an investment in transportation services of $50,000,000 value.

The courteous, efficient and neatly uniformed chauffeurs and guides who man the Gray Line fleet in Toronto are of the permanent staff of the Commission's carefully selected and thoroughly instructed men.

Hence, excellence of equipment and reliable, courteous and efficient service await Gray Line patrons in beautiful and interesting Toronto.

"The Gray Line in Toronto is served with a fleet of luxurious motor coaches. Driven by silent Knight 6-cylinder sleeve-valve engines, cushioned on Progressive Type springs and pneumatic tires, and equipped with four-wheel air brakes, they are masterpieces of modern automotive engineering. In body design and interior furnishings these new super-limousines equal the most luxurious private automobiles."

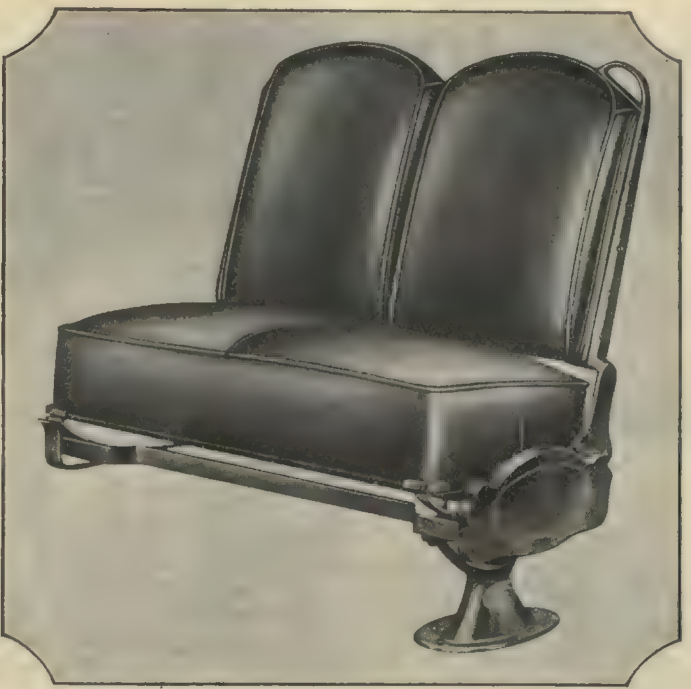
Constant good service! Reliability with comfort! That is the reputation which the Gray Line has been building for itself in Toronto as a result of its consistent week-in, week-out performance, through good weather and bad, winter and summer.

Yellow Coach *plus* General Motors assures consistent reliability — financial, research, transportation experience, manufacturing and equipment. All these, welded together, are at your service.

YELLOW TRUCK & COACH MANUFACTURING CO.
SUBSIDIARY GENERAL MOTORS CORPORATION
5801 WEST DICKENS AVENUE, CHICAGO, ILL.

101 YEARS OF MANUFACTURING EXPERIENCE

Snow sweeper rattan and cane webbing may be ordered through any H-W sales office.



No. 327-M

FOR INTERURBAN NEEDS

THIS Heywood-Wakefield seat is designed for the modern type of interurban service where comfort is now so important. It has been selected for both new cars and for replacement use.

It has deep, double spring cushions shaped to allow more leg freedom. Mechanism rails are set in. The individual backs are properly pitched for comfort.

Our car seating experts will be glad to help you decide on the best seating equipment for your needs. This service is free through any H-W sales office.

If you have not received a copy of our new Bus Seat Catalogue, write for it.

Heywood-Wakefield

REG. U.S. PAT. OFF.

Heywood-Wakefield Co., Wakefield, Mass.; 516 West 34th St., New York, N. Y.; 439 Railway Exchange Bldg., Chicago, Ill. H. G. Cook, Hobart Bldg., San Francisco, Cal. The G. F. Cotter Supply Co., Houston, Texas. F. N. Grigg, 630 Louisiana Ave., Washington, D. C. The Railway & Power Engineering Corp., 133 Eastern Ave., Toronto; Montreal; Winnipeg, Canada.

Some of the important exhibits in the case of

HASKELITE and PLYMETL

VS.

X. S. WEIGHT

Southern Ohio Public Service Company's car built by G. C. Kuhlman Car Co.

Grand Rapids Railway car built by St. Louis Car Co.

Chicago & Joliet Railway car built by Cummings Car & Coach Co.

Montreal Tramways car built by the Canadian Car & Foundry Co., Ltd.

THE verdict in this case is based on conclusive evidence. Wherever the modern lightweight car has been used, it has proved its superiority to the old heavy equipment which it displaced.

A typical car in which HASKELITE and PLYMETL have been fully utilized weighs 935 lbs. less than the same car with steel, wood and composition construction. This 935 lbs. dead load at 6c. a lb. adds $56.10 a year to the operating cost of each car. On the basis of a 7c. fare, this is equivalent to hauling 801 passengers free.

One city property with 20 new HASKELITE-PLYMETL cars made a saving in operating cost the first year of $48,897 of which $13,701 was a reduction in power consumed. Probably at least 10% of this amount is directly attributable to the decreased weight.

Another urban line with 27 new HASKELITE-PLYMETL cars reports increases in revenue amounting to as much as 8% and a saving in weight which at the standard figure of 6c. per lb. means a reduction in operating cost of $750 per year.

An interurban road with 10 new cars embodying HASKELITE in their construction has cut the weight and the energy consumption approximately 40%, as compared with the old equipment. It is also estimated that the improved appearance of these cars will attract an average of one round trip fare for each trip or an increase of revenue of more than $10,000 per year.

Others have remodeled old equipment with important savings and noticeable improvements in revenue.

The conclusion based on all this evidence is clear. Modern operating conditions demand modern equipment. Excess weight is doomed. The HASKELITE-PLYMETL car is the accepted standard. Send for complete information.

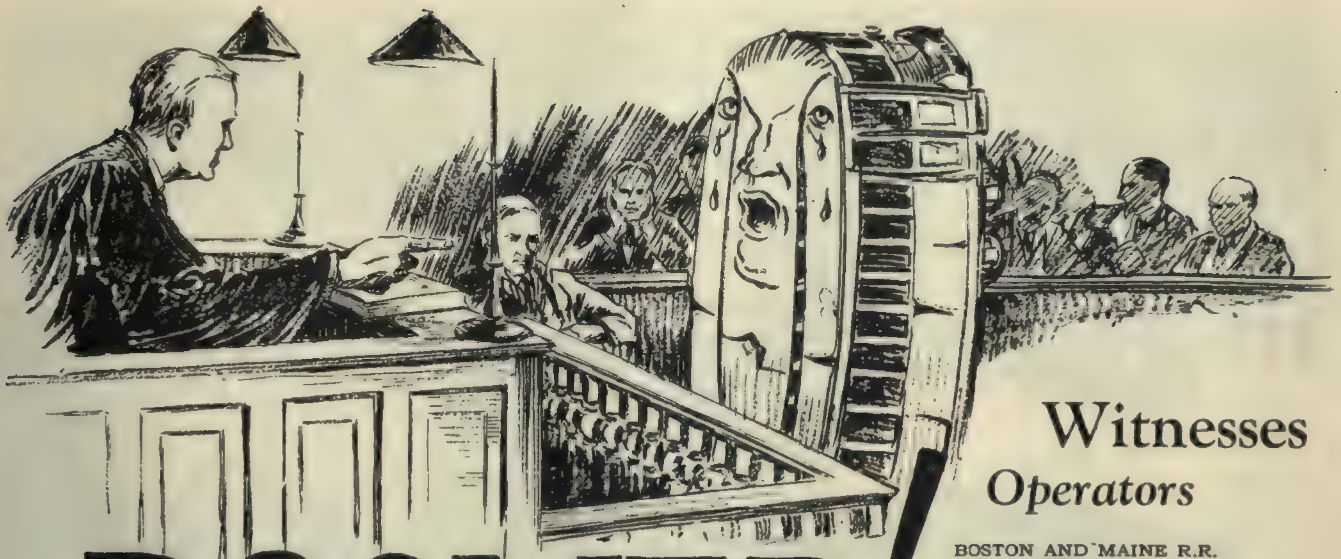
Haskelite Manufacturing Corporation
133 West Washington Street, Chicago
Canadian Representatives:
Railway and Power Engineering Corporation, Ltd.
Montreal Toronto Winnipeg

PLYMETL

PLYMETL, a plywood core with thin sheets of stretcher leveled steel glued to one or both faces. Maximum strength and minimum weight make it the ideal material for side panels for bus or street cars.

PLYMETL

ERJ1-1Gray



DOOMED!

Excess weight is doomed.

The electric railway industry has rendered its decision.

Modern car construction has won its case.

While scarcely a voice is raised in defense of the old style heavy equipment, witness after witness testifies to the decreased operating expense and increased revenue made possible through the adoption of the HASKELITE-PLYMETL car.

Note the partial list of builders and operators who express their approval of these champion lightweight materials with orders. The evidence supporting the claims made for HASKELITE and PLYMETL in street car and bus construction is yours for the asking.

Witnesses

Builders

CINCINNATI CAR CO.
Cincinnati, Ohio
THE J. G. BRILL COMPANY
Philadelphia, Pennsylvania
OTTAWA CAR AND MFG. CO.
Ottawa, Canada
ST. LOUIS CAR COMPANY
St. Louis, Missouri
G. C. KUHLMAN CAR COMPANY
Cleveland, Ohio
WASON MANUFACTURING CO.
Springfield, Massachusetts

CUMMINGS CAR AND COACH CO.
Chicago, Illinois
PRESSED STEEL CAR COMPANY
Pittsburgh, Pennsylvania
LIGHT WEIGHT NOISELESS CAR CO.
Chicago, Illinois
AMERICAN CAR COMPANY
St. Louis, Missouri
OSGOOD-BRADLEY COMPANY
Worcester, Massachusetts
NATIONAL STEEL CAR CORP., LTD.
Hamilton, Ontario, Canada

Witnesses

Operators

BOSTON AND MAINE R.R.
Boston, Mass.
THE CHICAGO, NORTH SHORE & MIL. R.R., Highwood, Illinois
CHICAGO SURFACE LINES
Chicago, Illinois
THE CINCINNATI TRACTION CO.
Cincinnati, Ohio
COLUMBUS RY., POWER & LIGHT CO.
Columbus, Ohio
THE DENVER TRAMWAY COMPANY
Denver, Colorado
DETROIT UNITED RAILWAY
Detroit, Michigan
FORT SMITH LIGHT & TRACTION CO.
Fort Smith, Arkansas
GALVESTON-HOUSTON ELEC. CO.
Galveston, Texas
GRAND RAPIDS RY. CO.
Grand Rapids, Michigan
GEORGIA RY. & POWER CO.
Atlanta, Georgia
ILLINOIS TRACTION, INC.
Chicago, Ill.
INDIANA SERVICE CORP.
Fort Wayne, Indiana
LOS ANGELES RAILWAY CORP.
Los Angeles, California
MILWAUKEE ELEC. RY. & LIGHT CO.
Milwaukee, Wisconsin
MONONGAHELA-WEST PENN PUBLIC SERVICE CO., Fairmont, West Virginia
MONTREAL TRAMWAYS CO.
Montreal, Quebec, Canada
MUNICIPAL RAILWAY OF SAN FRANCISCO, San Francisco, Cal.
PACIFIC NORTHWEST TRACTION CO.
Seattle, Wash.
THE PENNSYLVANIA-OHIO ELEC. CO.
Youngstown, Ohio
PHILADELPHIA RAPID TRANSIT CO.
Philadelphia, Pa.
THE PINE BLUFF COMPANY
Pine Bluff, Arkansas
PITTSBURGH RAILWAYS CO.
Pittsburgh, Pennsylvania
PUBLIC SERVICE RAILWAY CO.
Newark, New Jersey
SAN FRANCISCO-SACRAMENTO R.R.
Oakland, California
TORONTO TRANSPORTATION COMMISSION, Toronto, Ontario, Canada
UNION TRACTION COMPANY
Anderson, Ind.
UNITED TRACTION COMPANY
Albany, New York
YORK RAILWAYS CO.
York, Pennsylvania

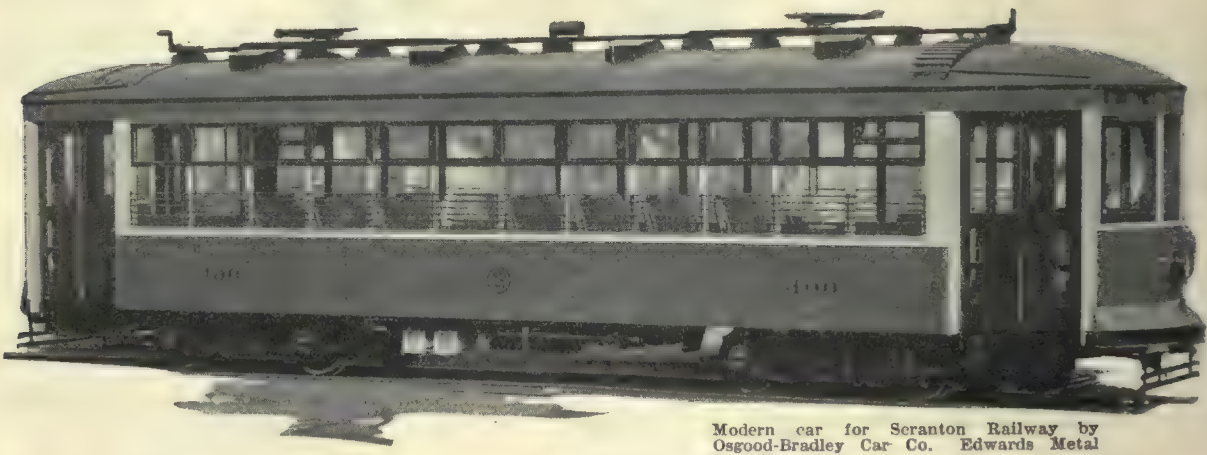
HASKELITE

HASKELITE

HASKELITE, the structural plywood, cemented with blood albumen glue producing a waterproof and practically unbreakable bond. Ideal for bus and street car roofs, floors and interior trim.

E. R. J. 1-Gray

windows DO MAKE A DIFFERENCE in *attracting* passengers



Modern car for Scranton Railway by Osgood-Bradley Car Co. Edwards Metal Sash is used.

Air-tight
Light in Weight
Easy to Operate
Noiseless
Durable

It's a proven fact!

Modern cars, with their clean lines and ample glass area, attract **more** passengers, stimulate more frequent riding.

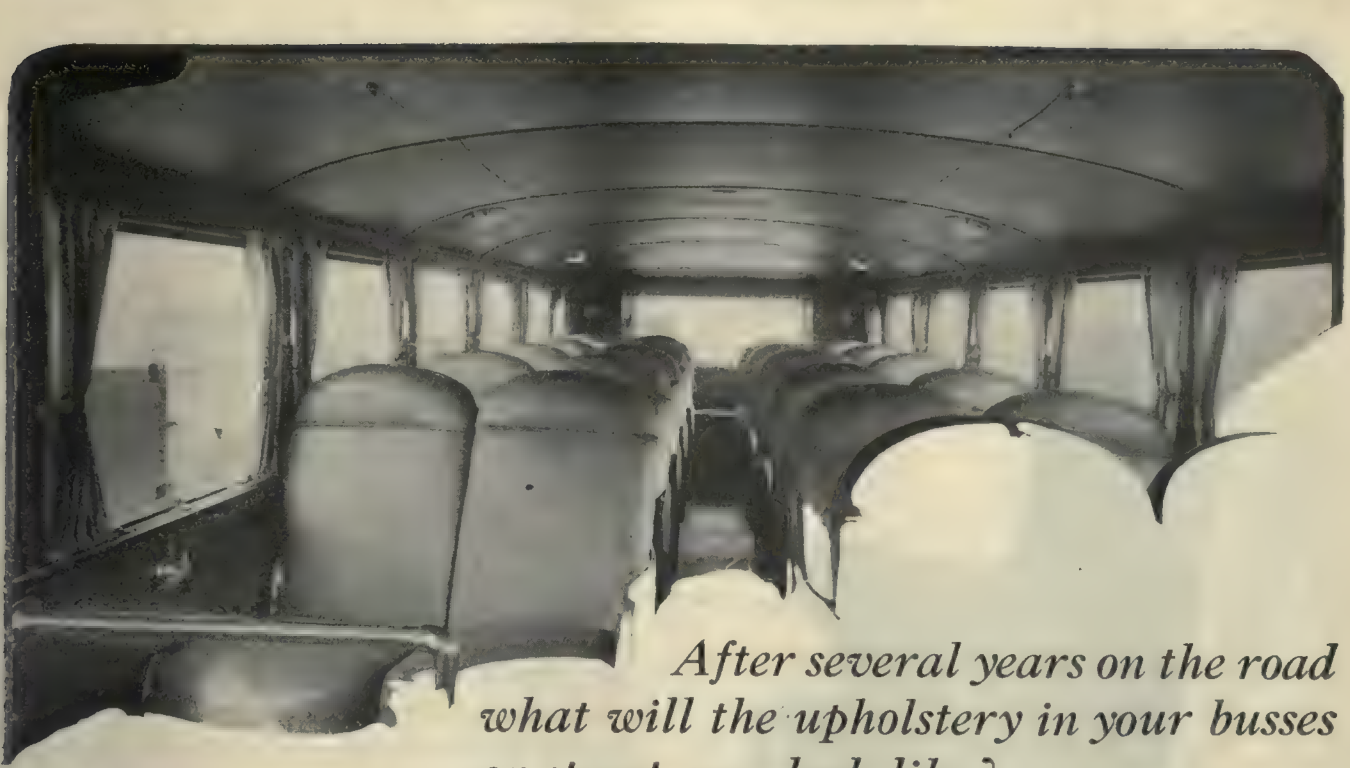
And Edwards Metal Sash goes a long way in making cars **modern.** Here's silent, air-tight, easy-to-operate sash that gives a maximum of clear vision, that makes a warmer car in winter, and airier car in summer, and a quieter car at all times.

Car builders will furnish Edwards Metal Sash on specification. Put it on your next order, and in the meantime, send for Catalog S, describing all types of Edwards Metal Sash.

O. M. EDWARDS CO.
Syracuse, N. Y.
New York Chicago

Canadian Representatives: Lyman Tube & Supply Co., Ltd., Montreal and Toronto

Edwards Metal Sash



After several years on the road what will the upholstery in your busses or street cars look like?

As rich as new if it's
REAL LEATHER UPHOLSTERY

Booklets containing samples and description of our many grades and finishes of leather gladly sent upon request.

Age doesn't punish leather. It mellows it. Years after it is put into service real leather upholstery will be selling rides for you. It will look rich, comfortable and will still be easy to keep clean. Hand Buffs, Machine Buffs and Special Machine Buffs made from selected packer steer hides and available in several finishes will KEEP your bus and car interiors looking their best. We are in a position to offer quotations on complete hides or on leather cut to pattern.

"Nothing takes the place of leather"

The Cleveland Tanning Company

Dennison Avenue & Jennings Road, Cleveland, Ohio

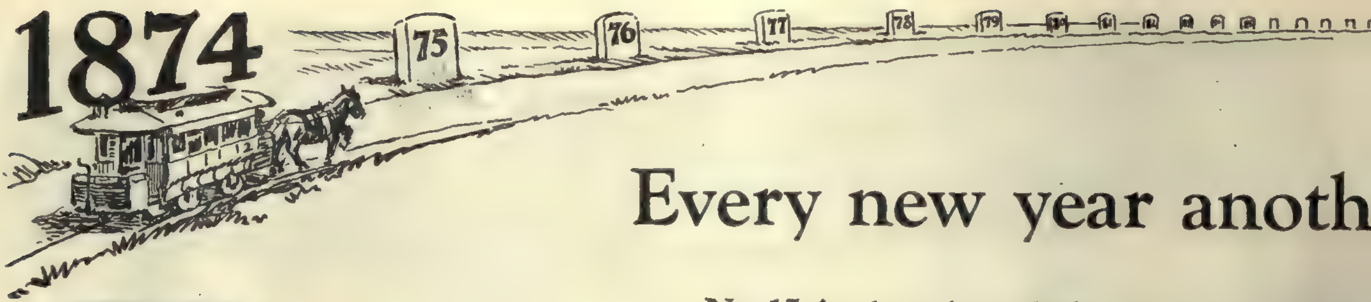
Western Representative:
Midgeley & Borrowdale,
McCormick Building,
Chicago, Ill.

©

Eastern Representative:
L. D. Rockwell Co.,
National City Building,
New York City

HYALINE

The Finest Coach Leather Obtainable



Every new year anoth

No. 15-A

No. 15-A—luxurious plush covered revolving chair with special patented features for finest type of interurban cars.

No. 900-A—de luxe, comfortable double chair for buses or cars.

No. 208—de luxe divided seat with air spring cushion pads upholstered in leather or fabric.

No. 900-D—double chair for bus or car with air spring cushion pads, attached to prevent promiscuous removal.

No. 199-F—special type, inexpensive but comfortable seat for suburban and light-weight interurban cars.

No. 392-EE—finest type of interurban car seat with extra high three part head-roll.

No. 900-A

Can also be made with rotating feature for double end cars.

No. 208

Hale and Kilburn SEATS

milestone of progress

in H-K Seats for cars and buses

More than fifty years have passed since Hale & Kilburn started to make vehicle seats. Since then they have served continuously—each year guiding and leading the way toward better transportation by means of more comfortable and more practical seats.

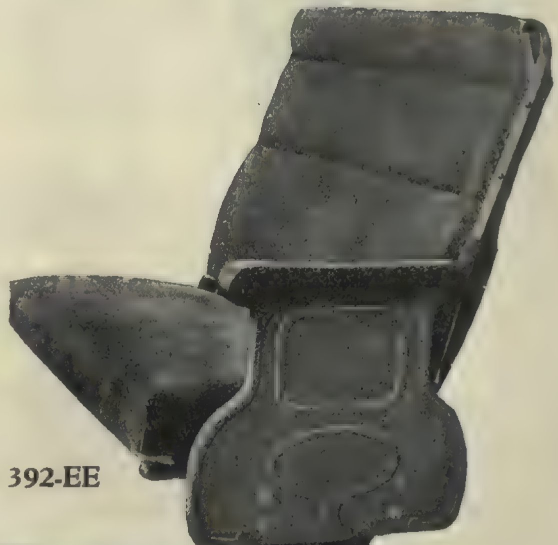
H-K Seats today are found in every type of modern electric railway car and bus service—where they have established an enviable reputation for their comfort, appearance and excellent wearing qualities.

A request will bring full particulars of our many types for both cars and buses.

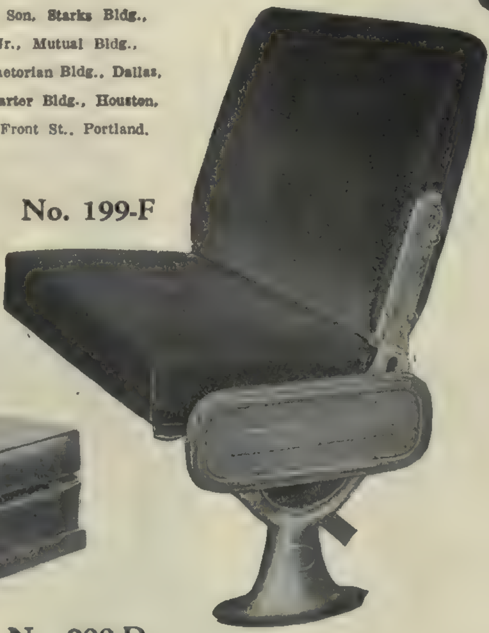
HALE-KILBURN COMPANY
General Office and Works:
1800 Lehigh Avenue, PHILADELPHIA

SALES OFFICES:

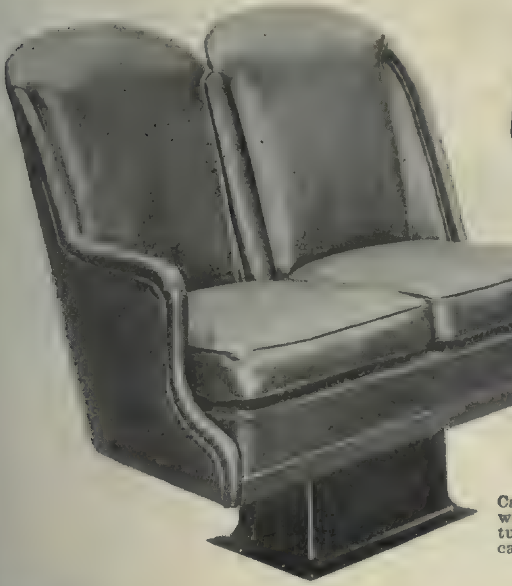
Hale-Kilburn Co., 30 Church St., New York
Hale-Kilburn Co., McCormick Bldg., Chicago
E. A. Thornwell, Candler Bldg., Atlanta
Frank F. Bodler, 903 Monadnock Bldg., San Francisco
Chris Eccles, 320 S. San Pedro St., Los Angeles
T. C. Coleman & Son, Starks Bldg., Louisville
W. L. Jefferies, Jr., Mutual Bldg., Richmond
W. D. Jenkins, Praetorian Bldg., Dallas, Texas
W. D. Jenkins, Carter Bldg., Houston, Texas
H. M. Euler, 46 Front St., Portland, Oregon



No. 392-EE



No. 199-F



No. 900-D

Can also be made with rotating feature for double end cars.

Hale and Kilburn SEATS

More Mileage per Motor Bearing

A traction motor will stand what its bearings will stand—and no more. It will last as long as its bearings—and no longer. Motor ability is limited by bearing ability.

The simple, rugged ***"Hoffmann"***—with its big, solid rollers and heavy races of hardened, heat-treated alloy steel, and with its unmatched precision—has that big reserve of strength and endurance which stands up under the heaviest loads and hardest service of severe traction duty.

With dust-and-water-tight mounting and magazine lubrication, it is practically trouble-proof and neglect-proof

NORMA-HOFFMANN
BEARINGS CORPORATION
Stamford — Connecticut
PRECISION BALL, ROLLER AND THRUST BEARINGS

Write for Catalog 904. Ask our engineers to give you the benefit of their long experience — without obligation.

"HOFFMANN"

PRECISION ROLLER BEARINGS

You never heard of a Mack rear-end failure

Rugged strength—
Generous road clearance—
Unfailing reliability—

These are vital to a bus rear axle—

The strongest steel in its stoutest form—That's heat-treated chrome-nickel steel, drop-forged.

For permanence, reliabilily and ability to hold its shape nothing equals a one-piece drop-forging.

Maximum strength in the plane of greatest shock; room for the largest size of Bull Gear; generous road clearance—combined only in a banjo type axle inclined at 45 degrees.

Also in the Mack rear axle banjo, the following vital features are combined.

No welds, no shrunk, or bolted joints, no truss rods, no brittle, heavy, low-strength castings. Wheel spindles, axle beam, gear carrier mounting, brake flange bases and spring perches all integral.

No wonder the Mack rear axle stands the gaff!

The Capitol District Transportation Company of Albany, N. Y.,
subsidiary of the United Traction Co., use
6-cylinder Mack Gas-Electric Buses

Indeed, Performance Counts!

Cobblestone pavements; steep grades—as steep as 9.17 per cent; city traffic; fast schedules. Such conditions demanded the unusual. The Capitol District, after their previous experiences, felt that such obstacles could best be met with Mack.

Here, indeed, was the test for a rear axle—and it has never failed them yet.

These 27 6-cylinder Mack Gas-Electrics supplement the work of the Mack 4's which are in service—constantly—in Troy, Rensselaer and Albany for the Capitol organization. And they work where there is hard work to be done.

Albany can tell you what it means to have freedom from rear end trouble. They know just how many more days each year such buses stay on the road—and how much more they can earn.

They know—Performance Counts.

Mack Trucks, Inc.

International Motor Company
25 Broadway, New York City

The spacious team yard of the Atchison, Topeka and Santa Fe Railway, Chicago, completed 1926. Paved with concrete 10 inches thick.

Scientific Planning and Concrete Makes Team Yards Convenient and Efficient

Busy team yards must be ever in service—space between tracks and elimination of "bottle necks" are important. But well planned team yards must be well paved, too. Concrete does it. Smooth, easily cleaned, light colored for economical illumination at night, rugged and unyielding, this modern paving material meets every requirement for heavy hauling.

PORTLAND CEMENT ASSOCIATION
CHICAGO
A National Association to Improve and Extend
The Uses of Concrete

CONCRETE *for permanence*

50 Plants—Daily Capacities 20,000 Wheels

The first
Railroad Coach
"The Experiment"
1825

Give us the service and we'll give you the Chilled Car Wheel

A modern up-to-date car, equipped with chilled wheels

A. R. A. Standards

650 lb. Wheel for 30 Ton Cars
700 lb. Wheel for 40 Ton Cars
750 lb. Wheel for 50 Ton Cars
850 lb. Wheel for 70 Ton Cars

ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS
1847 McCORMICK BUILDING, CHICAGO

Sailing Ahead With Time

FOR CENTURIES the passage of time on ship-board has been marked in the same way—the twelve hour cycle divided into three periods of eight bells each. Regardless of the most modern chronometer in the Captain's cabin or the watch in his pocket, this ancient method is established and endures.

Time means progress. And *Consolidated* keeps step with time by continual modernization of its devices. Every modern advance in electrical development, as applied to car heating, door control or signalling, is reflected—usually first—in *Consolidated* equipment.

Sail Ahead With Time—Specify CONSOLIDATED

ELECTRIC HEATERS	PNEUMATIC DOOR OPERATORS	THERMOSTATIC CONTROL	BUZZERS AND BELLS

CONSOLIDATED CAR-HEATING CO.

NEW YORK ALBANY, N. Y. CHICAGO

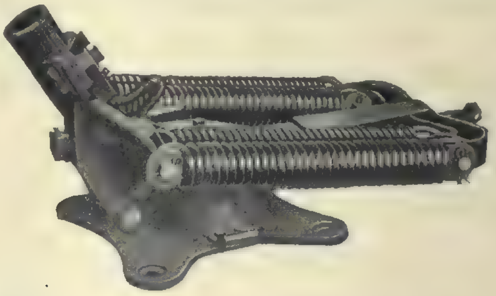
—and also in favor of a more modern kind of trolley base—

NUTTALL

TIMKEN EQUIPPED TROLLEY BASE

FORM U. S. 20-A

As far in advance of old designs as the modern car is ahead of cars built twenty years ago. Timken Tapered Roller Bearings insure durability and sensitiveness permitting the trolley to swivel freely and instantly follow changes in trolley wire alignment. Design is such that the base actually hangs on the bearings and not on the center pin, "cocking" strains are evenly distributed; all wearing parts are hardened; and lubrication is taken care of by a twice a year oiling system.



Nuttall

stronger argument

in favor of silent, vibrationless low cost helical gears

Car designers have stressed safety, comfort and appearance, and the public is educated to a new standard of electric railway service.

Certainly in this new conception of the electric car as the most *popular* of public transportation agencies, there is no place for the noise and vibration of spur gearing, even though it be reduced, *when the equipment is new*, by accuracy of design and fit.

Every year has seen a steadily increasing number of Nuttall Helical Gears on modern cars ordered by successful roads all over the country. And many a retiring veteran of the rails has made its last trip on Nuttall Helicals with half a million miles to their credit.

The meshing of helical gears is like the engagement of a screw, no grinding, and no chattering. Helicals save wear and tear on motors, car bodies and passengers' nerves. Their use results in really quiet cars.

NUTTALL
Standard Helical
GEARS

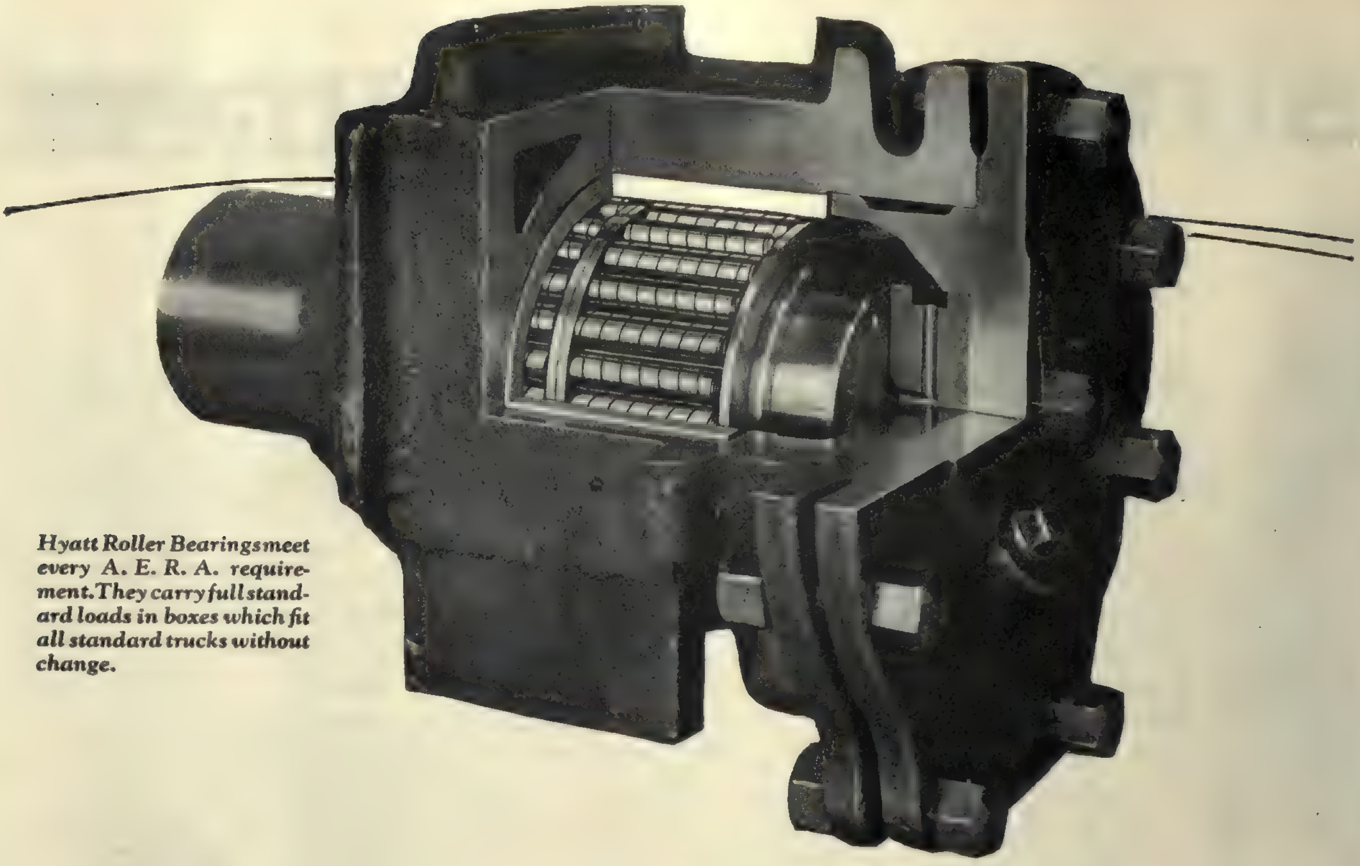
have the added advantage of the famous Nuttall BP Heat Treatment. They're guaranteed for 300% greater wear and breakage resistance than gears of standard untreated cast steel.

Actual operating data containing some very illuminating figures on gear cost will gladly be furnished on request.

R. D. NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

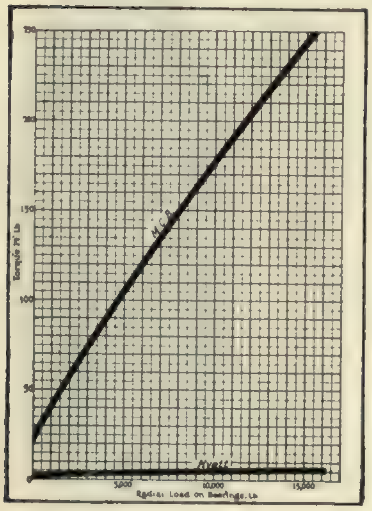
All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

Nuttall



Hyatt Roller Bearings meet every A. E. R. A. requirement. They carry full standard loads in boxes which fit all standard trucks without change.

Acceleration



Quick get-aways help maintain schedules. No sticking bearings — even in zero weather.

Easier Hyatt acceleration is shown above — the record of comparative tests using Hyatts and standard bronze.

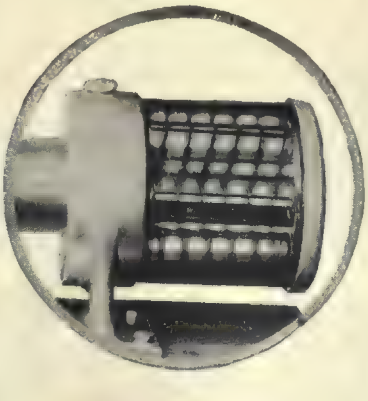
Loads up to the maximum axle rating and speeds were used.

Lubrication

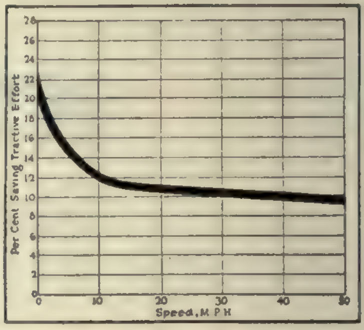
Check up the oil level every four or five thousand miles. Addition of a gill or two of lubricant is the usual requirement.

Your standard journal lubricant will do. It is not necessary to stock special grades.

Boxes are leak proof and dirt tight. The oil stays clean —and is kept in motion over every part of the bearing surface. Note oil tracks on the model below.



Power Saving

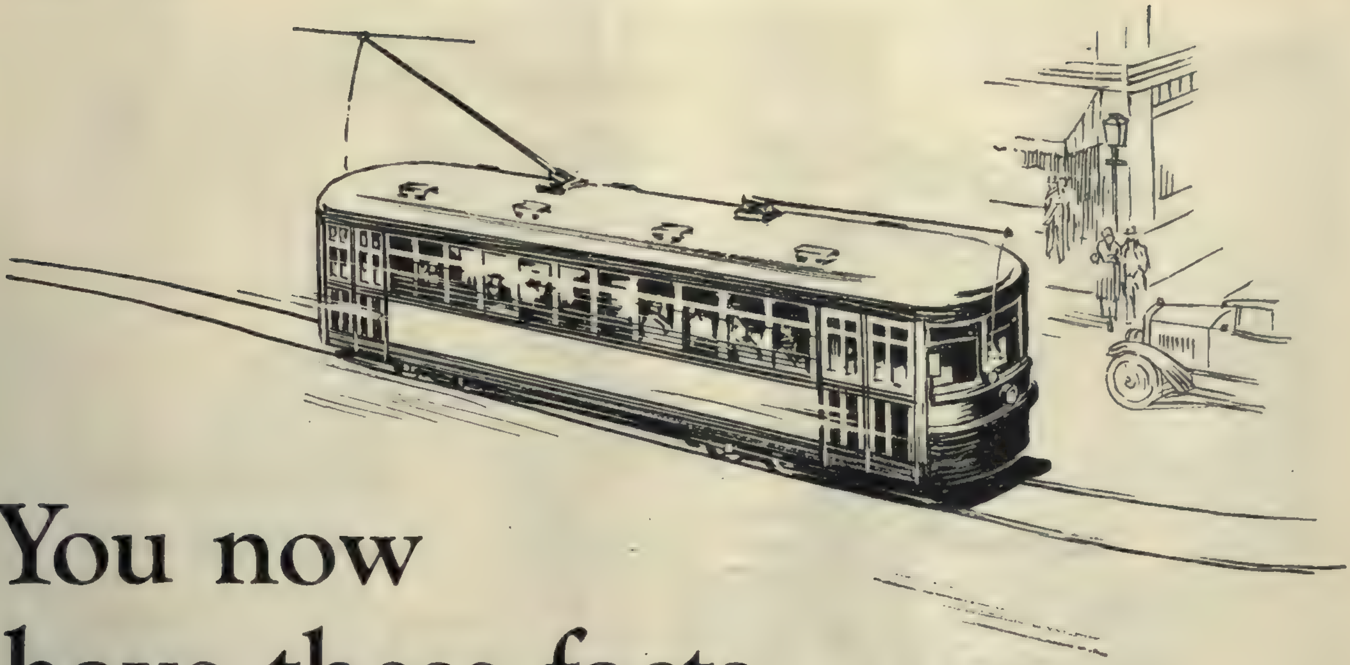


Again it is a matter of free rolling motion as against sliding friction. The difference in power consumption is apparent.

If power saving were the only virtue of Hyatt Roller Bearings, the economy is so big that no car can really be called modern unless so equipped.

The chart tells its own story—study it.

Saving one-fifth on power and lowering peak load is measurable economy.



You now have these facts on roller bearing operation

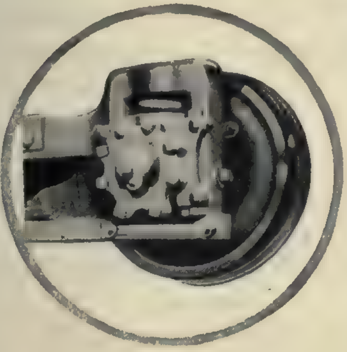
Maintenance

A Hyatt equipped car is not subject to chronic journal trouble.

Positive lubrication eliminates hot boxes. There is no waste or other packing to replace.

Life of Hyatts is measured in hundreds of thousands of miles against 50-60 thousand mile replacement of standard brass bearings.

Journal maintenance is reduced to checking for loose nuts. The savings promoted are readily appreciated.



YOU now have these proved facts upon which to base your judgment.

Hyatt Roller Bearings have 1,500,000 car miles behind them in every condition of service—1,500,000 miles of such economy and dependability as to leave no room for speculation.

Individual cars so equipped have reached the 180,000 mile mark without showing a sign of journal bearing wear. And without requiring bearing repair or replacement.

Axles turned below the scrap limit may be salvaged—returned to service, for Hyatt inner races make up the difference.

The question that naturally will occur to *you* is, "In the face of these astonishing economies and advantages, how can any car be 'modern' without them."

HYATT ROLLER BEARING COMPANY
Newark, N. J.

The Canadian Fairbanks-Morse Company, Ltd.
Distributors of HYATT RAILWAY BEARINGS in Canada

HYATT
QUIET ROLLER BEARINGS
PRODUCT OF GENERAL MOTORS

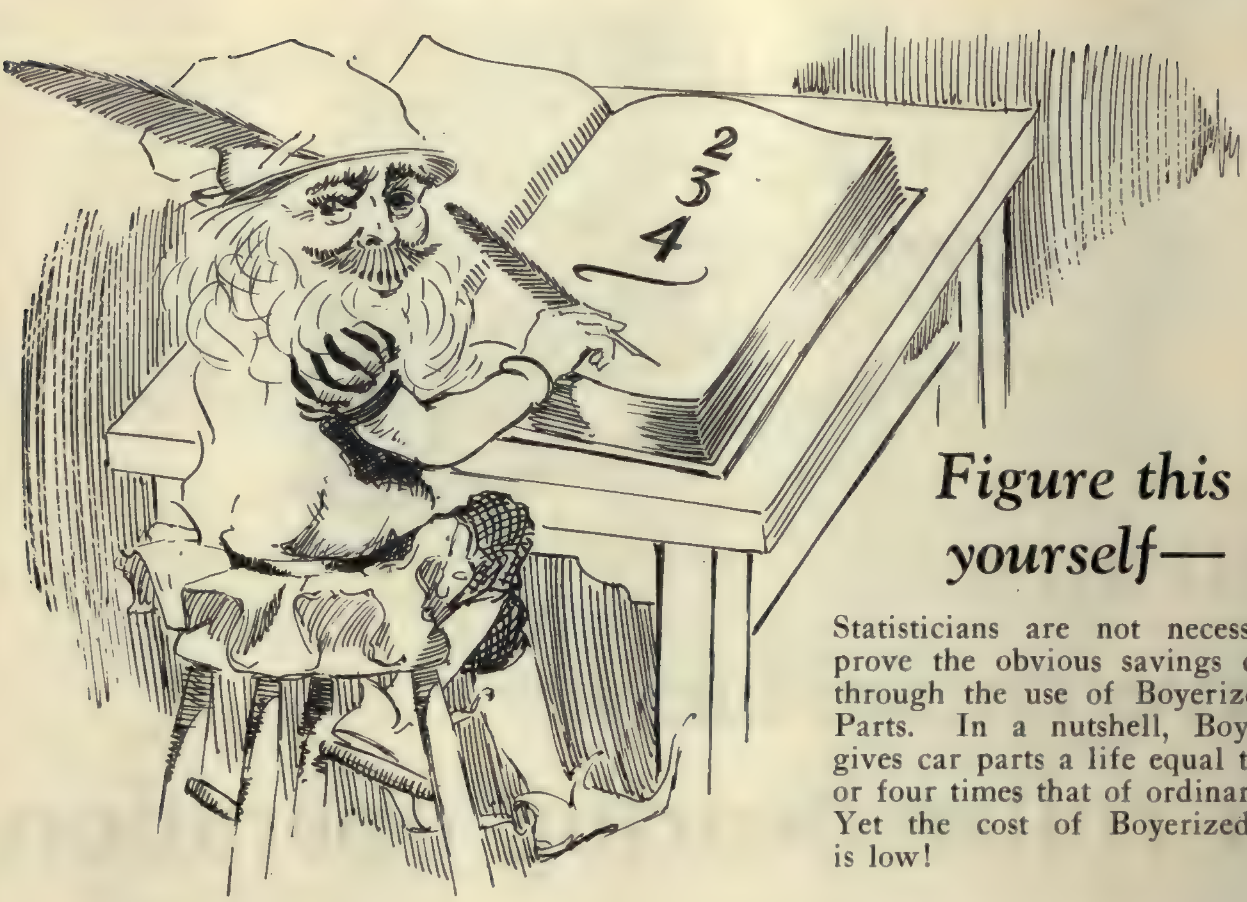


Figure this yourself—

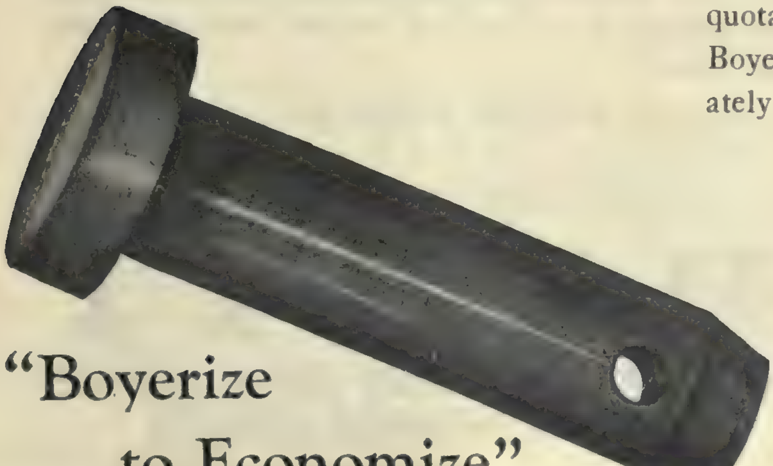
Statisticians are not necessary to prove the obvious savings effected through the use of Boyerized Car Parts. In a nutshell, Boyerizing gives car parts a life equal to three or four times that of ordinary steel. Yet the cost of Boyerized Parts is low!

BOYERIZE one or more cars for a test. Keep actual comparative cost and performance records—then figure yourself what the actual result is. You will agree that to Boyerize is to Economize.

And ample proof that to Boyerize is to Economize will be found in the performance records of all *Boyerized* railways.

Write today for detailed information and quotations. Or pick from the list such Boyerized Parts as you may need immediately and let us ship you a trial order.

- Brake Pins
- Brake Hangers
- Brake Levers
- Pedestal Gibs
- Brake Fulcrums
- Center Bearings
- Side Bearings
- Spring Post Bushings
- Spring Posts
- Bolster and Transom Chafing Plates
- McArthur Turnbuckles
- Manganese Brake Heads
- Manganese Truck Parts
- Bushings
- Bronze Bearings



"Boyerize to Economize"

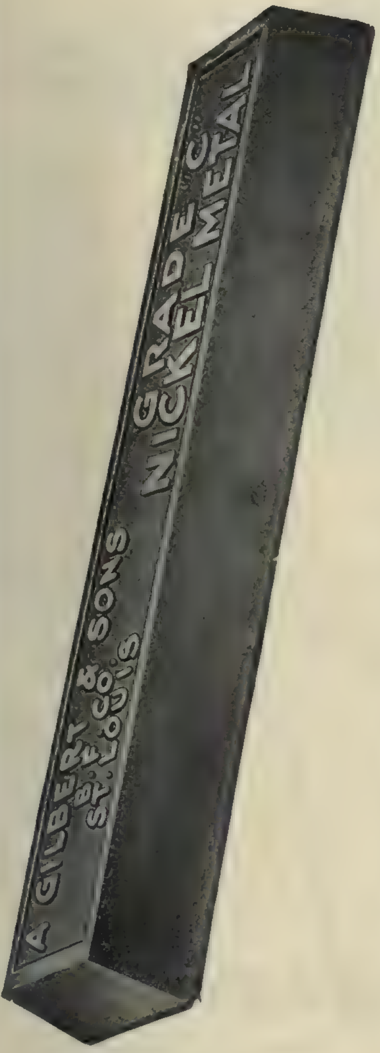
Bemis Car Truck Company
Electric Railway Supplies
Springfield, Mass.

Representatives:
Economy Electric Devices Co., Old Colony Bldg., Chicago, Ill.
F. F. Bodler, 903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney, 54 First Street, Portland, Ore.
J. H. Denton, 1328 Broadway, New York City, N. Y.
A. W. Arlin, 772 Pacific Electric Bldg., Los Angeles, Cal.

GILBERT'S

Quality Babbitts

Street Railway Specialties



Gilbert "C" Grade Nickel Metal. A composition especially designed for lining Electric Street Car Armature Bearings. It is a tin base metal with nickel, antimony and copper and is by far the most dependable metal for use under heavy loads and excessive vibration.

The rendering of maximum service to the electric railways was the prime factor in the development and our final selection of the metallic composition of Gilbert's Quality Babbitts—Street Car Armature, Axle and Journal Bearings—Trolley Wheels and Harps.

These compositions were made our standards only after 26 years of engineering and metallurgical experimentation during which many compositions were tested in actual service and their performances compared with that of similar products of other leading manufacturers in the country.

The compositions which gave the best results were adapted as Gilbert's Standards, and are known today as follows:

Gilbert Velox Bronze—for armature, axle, and journal bearings.

Gilbert "C" Grade Nickel Babbitt Metal — for linings of armature bearings.

Gilbert "I" Grade Anti-friction Metal for linings of journal bearings and Axle Bearings.

Gilbert Phosphor Bronze—for check plates.

Gilbert Trolley Bronze—for trolley wheels.

Gilbert Quality Babbitts and Street Railway Specialties are "Best by Test."

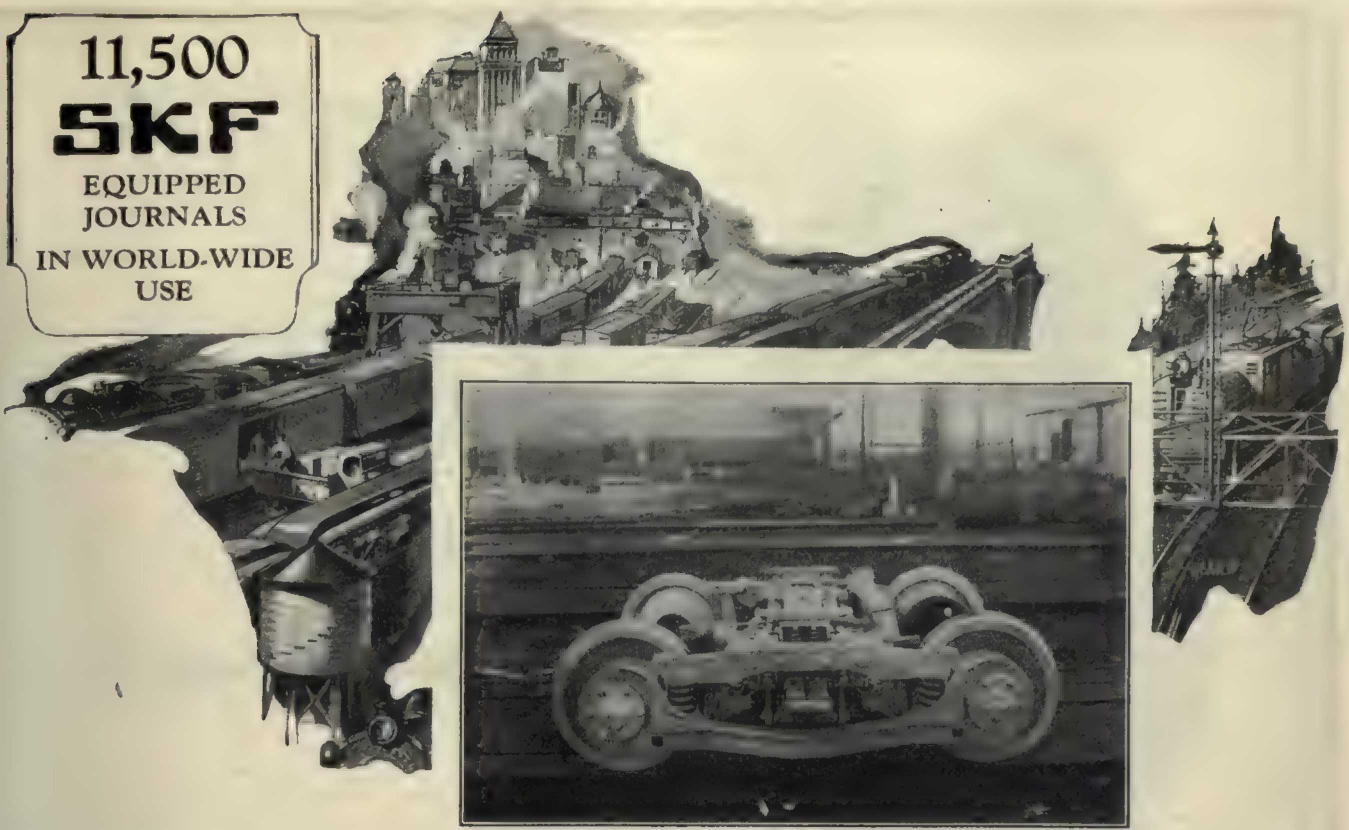
Gilbert Velox Bronze Armature Bearings for Street Car Motors. Made up in Solid Bronze or lined with "C" Grade Nickel Babbitt. Tests show as high as 88,000 car miles. Far superior to anything in the way of a bearing on the market today.

A. GILBERT & SONS BRASS FOUNDRY CO.

ST. LOUIS, U. S. A.

CARNEGIE STEEL COMPANY

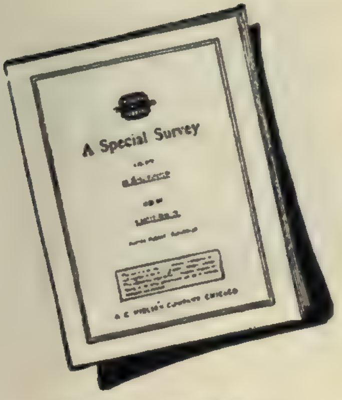
—extends to you
cordial greetings
for the New Year—
may Nineteen-Twenty-Seven
bring you prosperity
and success



SKF Bearings Accomplish Two Jobs— They Improve Service and Cut Costs

WITH street railway problems and operation occupying a sphere of increasing public importance, traction managements are focussing their attention more and more on the double-barrelled task of improved service with decreased maintenance costs. As a result, greater thought is now given to the details of bearing design and operation which, in reality, achieve two objectives.

On the car truck shown above, Skayef Self-Aligning Roller Bearings have proved, through intensive service, to be rugged, dependable units materially improving operation and effecting definite economies. Journal wear, hot boxes and waste of oil are entirely eliminated. There is no need for constant inspection. Cars run smoothly over the road, earning profits instead of wasting time in repair shops.



**Special Certified Survey
Sent on Request**

Send for Certified Survey No 1727 giving detailed operating advantages secured through SKF Bearings by a large traction company.

SKF INDUSTRIES, INCORPORATED
165 Broadway, New York City

1727

More than 100 Factory Offices Throughout the World
SKF
Puts the Right Bearing in the Right Place
HESS-BRIGHT
SKF
SKAYEF
Ball Bearings
Roller Bearings

Griffin Wheels
with
Chilled Rims
and
Chilled Back of Flanges

From the standpoint of both
Economy and *Safety*
THE CHILLED IRON WHEEL
is the ideal wheel for
ELECTRIC RAILWAY SERVICE

GRIFFIN WHEEL COMPANY
410 No. Michigan Ave. Chicago, Ill.

Foundries:
Chicago
Tacoma
Detroit
Kansas City
Cleveland
Denver
Los Angeles
St. Paul
Salt Lake City
Cincinnati
Boston
Council Bluffs

The Big Parade

The Big Parade in 1918, when our fighting boys came back from France, was a welcome sight indeed, but now it's different when you see a big parade of electric railway cars headed for the repair shop, and the responsibility of repair and maintenance rests on *you*.

Cars that are shopped because the carbon brushes wear out prematurely is a nuisance that can be eliminated by installing Stackpole Brushes made for the job.

For all Stackpole Brushes are self-lubricating, the carbon being compounded to a scientific degree of hardness to assure minimum brush wear, yet soft enough to maintain a smooth, efficient contact that remains uniform right down to the holder.

Try reducing the Big Parade to the Repair Barn
By installing Stackpole Brushes.

STACKPOLE CARBON COMPANY
St. Marys, Penna.

Stackpole
carbon brushes

VIZABLEDG
PATENTED
SAFKAR
TRADE MARK REG
SAFSTEP

In adopting this approved accident-proof safety car step, you will be buying dependable liability insurance at extremely low cost.

Slip-proof, miss-proof, self-cleaning, it minimizes "aisle" accidents as well as "step" and "platform" accidents.

Damages paid for one such accident may cost you more than a "Safkar" Step equipment for every car on your system.

Let us send Bulletin D 28.

IRVING IRON WORKS CO.
LONG ISLAND CITY. N.Y. U.S.A.
Established 1902

P-135

Gary Wheels Weren't Needed in These Days

But Times Have Changed As You Will Agree

It was a leisurely life in the days when this picture was taken. Time was plentiful, car schedules lenient. If you happened to forget your bundle, a good natured conductor would stop the car and go after you.

But today—speeding automobiles ‥ hurried commuters ‥ long car runs ‥ fast, stringent schedules ‥ sudden stopping ‥ quick starting ‥ and always a necessity for lowest possible mileage costs.

No wonder Gary Wrought Steel Wheels carry so much of the rolling stock of present day electric railroads.

Illinois Steel Company

208 South La Salle Street
Chicago, Illinois

Here's the Evidence

OHIO
ELECTRIC RAILWAY COMPANIES
UNANIMOUS
"TOOL STEEL" GEARS AND PINIONS
In Western Canada
100% users of "Tool Steel" Gears and Pinions
100%
Southern Equipment Men Favor "Tool Steel" Gears and Pinions
Association News & Discussions
82% use "Tool Steel" gears
C.E.R.A. Master Mechanics
"Tool Steel" Leads Again
AERA asked
and the RAILWAY MEN answered
84% use Tool Steel
ELECTRIC TRACTION
75% use "Tool Steel" gears
Speed Trophy Contestants
The Tool Steel Gear & Pinion Co.
CINCINNATI, OHIO
"Tool Steel" Leads Again
The A.E.R.A. Equipment Committee
88%
Tool Steel Quality T.S.Q. Tool Steel Quality
The Tool Steel Gear and Pinion Co.
Cincinnati, Ohio
QUALITY
PINIONS

What's Your Verdict?

The figures shown above indicate the extent of "Tool Steel" Gear acceptance.

They pay more for "Tool Steel" gears—they get more—in long life and care-free service.

We have available, detailed facts covering the above figures.

The Tool Steel Gear & Pinion Company
Cincinnati, Ohio

Operators *and* Public agree on the Motor Coach of Medium Capacity

Not too big —

GRAHAM BROTHER

SOLD BY DODGE BROTHER

but big enough

Growing Traffic Congestion, Costs, Schedule Flexibility, Public Demand—all these factors are increasing the popularity of the 21-Passenger Motor Coach

Sales of Graham Brothers 21-Passenger Motor Coaches have been increasing steadily. Repeat orders are increasing the sizes of successfully operating fleets.

Graham Brothers Coaches are being selected in preference to the large, heavy type buses for numerous operations where service is essential and costs must be kept down.

Increased patronage indicates public appreciation of the more frequent service operators are able to furnish with Graham Brothers Coaches—of medium capacity and inexpensive to operate and maintain.

Correct in size, attracting patronage by their trim appearance, safe and comfortable to ride in—Graham Brothers Motor Coaches are a safe, practical investment wherever passengers are to be carried.

Dodge Brothers Dealers everywhere sell and service them.

PRICES—Standard 21-Passenger Street Car type, complete, $3815; 12-Passenger Parlor Coach, complete, $3750; f. o. b. Detroit.

MOTOR COACHES

EALERS EVERYWHERE

SERVICE

Always—and Everywhere

For completeness and accessibility the service facilities for Graham Brothers Motor Coaches are not equalled by any other motor coach organization—either manufacturing or selling. When repair is necessary on a Graham Brothers Motor Coach the mechanic is right there. Any needed spare part is right there. The coach is laid up only long enough for the actual work to be done—no waiting, no delay.

Every Dodge Brothers Dealer is equipped to give immediate service. He knows Graham Brothers Motor Coaches. He always carries a complete stock of repair parts. He is right there where you bought your motor coach this year, next year, whenever you need him.

Each Graham Brothers Coach is the tried and tested product of a great manufacturing institution—famous as a builder of high quality motor vehicles. The skill of thousands of workers, the best of materials, the results of years of experience—all assure you a dependable motor coach that will work with the minimum of interruption year after year and mile after mile.

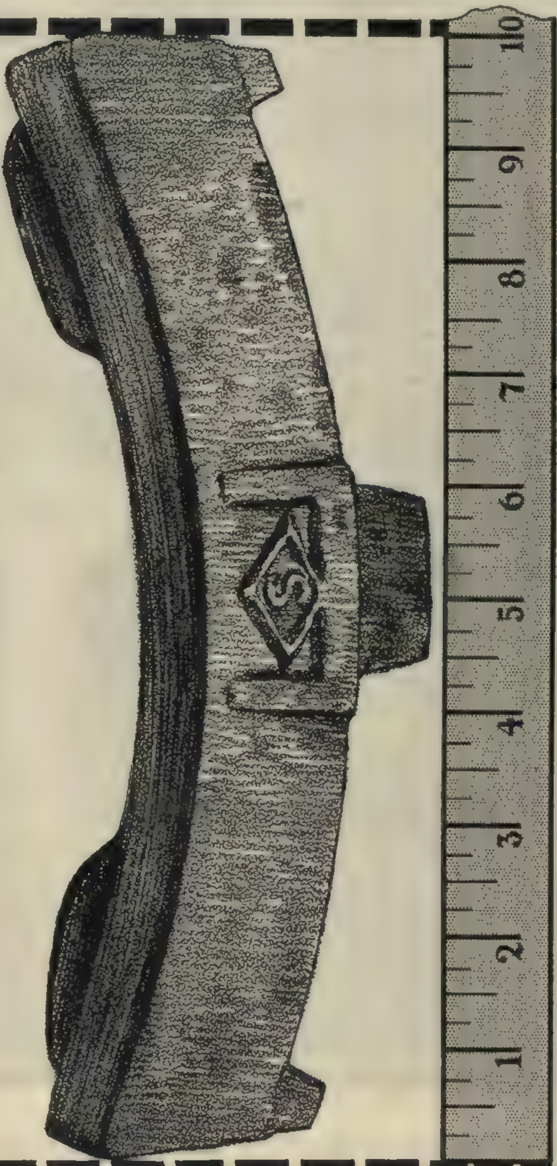
Then, to further safeguard your investment and your service to your patrons, you have at your call the great nation-wide organization of Dodge Brothers Dealers.

GRAHAM BROTHERS
Evansville — DETROIT — Stockton
A DIVISION OF DODGE BROTHERS, INC.
GRAHAM BROTHERS (CANADA) LIMITED—TORONTO, ONTARIO

DO YOUR BRAKE SHOES MEASURE UP?

IT is natural, at this time of year, to review the cost of items used in operation and to measure up the value of the service they have rendered. When comparing cost and value in this way it is, of course, essential to employ true standards. A brake shoe, for example, should be measured *not* by dollars, *not* by pounds, *not* by inches, *not* by work but by a combination of these factors—its cost per foot pound of work delivered. Measure the useful work accomplished between first application and final removal and you establish its true value. Every type of American Brake Shoe is measured in this way, on our brake shoe testing machine. It is measured again in actual use. It must show that it can stop a car at a lower cost per unit of work than other shoes in similar service. It must demonstrate that it is truly—

"Best by Test"



THE AMERICAN BRAKE SHOE AND FOUNDRY COMPANY

30 CHURCH ST., NEW YORK
332 SO. MICH. AVE., CHICAGO

NEW RAILS AND TRACK MATERIALS

PRICE—L. B. Foster Company competes chiefly on a price basis. It sells at a price which stimulates buyers' preference.

QUALITY—Standard—High Grade—Dependable.

GUARANTEE—Every shipment backed by an inspection and approval at destination guarantee—also subject to guarantee in service.

SERVICE—Warehouses, Storage Yards complete with Fabricating Machinery—centrally located, facilities unequalled.

[Can you afford to place your next order without first receiving FOSTER'S proposition?

L·B·FOSTER COMPANY

PITTSBURGH · CHICAGO · NEW YORK

ROOT

SPRING SCRAPERS

Maintain Summer Schedules in Mid-Winter!

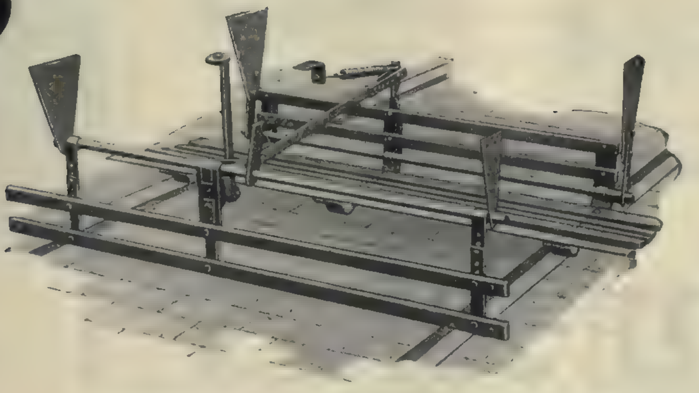
Root Spring Snow Scrapers keep the track clear of snow and ice. They are pneumatically operated by the motorman without leaving his station.

Modernize your snow fighting methods by installing a Root Spring Scraper on all of your modern rolling stock!

ROOT

SPRING LIFE GUARDS

One Hundred Percent Safety!



One hundred percent safety is, of course, practically impossible. The Root Spring Life-Guard, however, is the nearest step in that direction. It is different from any other guard on the market. It is made to work instantly when needed. It is the lightest—the strongest—the simplest—the best working—the *safest* and has the least upkeep of any life guard.

Send for catalogue showing complete line of Root Equipment

ROOT SPRING SCRAPER CO.

Kalamazoo, Mich.

DISTRICT REPRESENTATIVES:

Ross F. Hayes, 30 Church Street, New York, N. Y.
Charles N. Wood Co., 948 Old South Bldg., Boston Mass.
Grayson Railway Supply Co., 601 La Salle Bldg., St. Louis, Mo.
Railway & Power Engineering Corp., 133 Eastern Ave.,
Toronto, Canada.

Lowest in ultimate cost—
Highest in net efficiency—

To insure better service and to minimize operating costs, large and small systems throughout the country standardize on More-Jones Quality Products. Modern car operation demands highly modern equipment. This organization, with more than a half century of experience has been in contact with street car problems since their beginning and knows modern operating requirements.

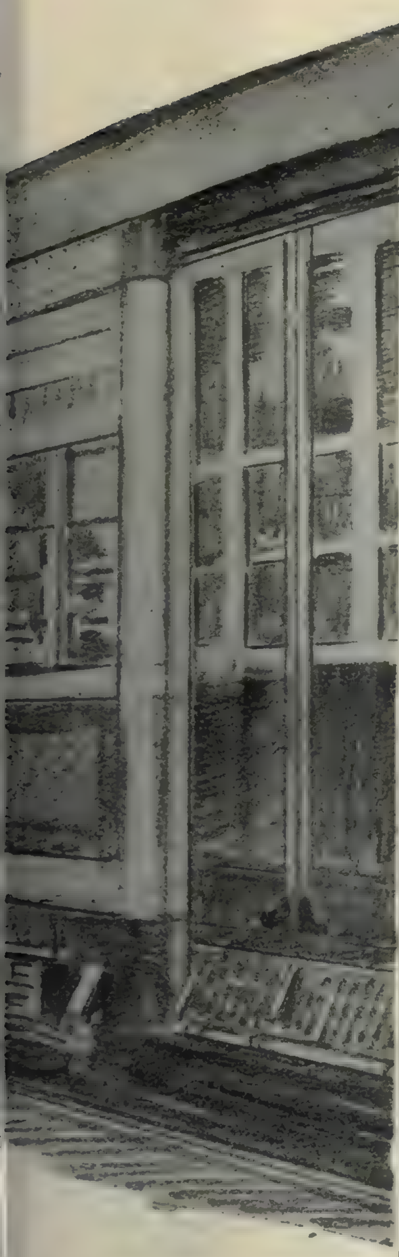
Uniformity of More-Jones Quality Products has always been carefully maintained and can be depended upon.

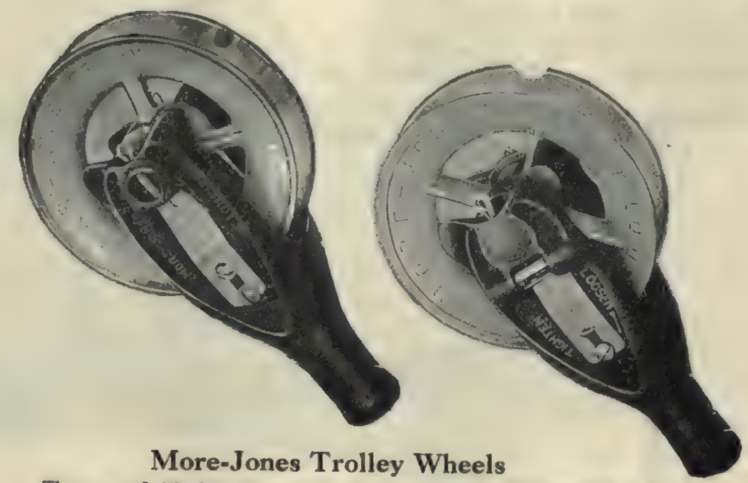
Let us give you further information and prices. Prompt shipments assured.

More-Jones Brass & Metal Co.
St. Louis, Mo.

MORE-JONES
QUALITY PRODUCTS

More than 50



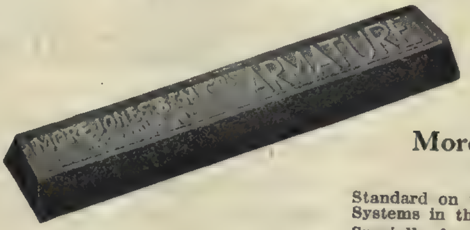


More-Jones Trolley Wheels

They are finished and bored in one operation, thus insuring proper balance.

The Metal used is exceedingly tough—an alloy of purest new metal, having maximum conductivity—which provides greater mileage without damage to the overhead lines.

V-K Oil-less Wheels for City and Suburban service and More-Jones lubricated Wheels for high speed requirements insure lowest ultimate cost.



More-Jones ARMATURE Babbitt Metal

Standard on the majority of Electric Railway Systems in this country.

Specially formulated for the exacting requirement of Electric Railway Armature Bearing maintenance.

Its high heat radiation minimizes friction, even under the most trying circumstances.

A trial is the most conclusive proof of its superior inherent characteristics.

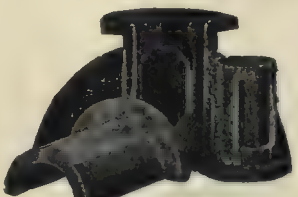
"Tiger" Bronze Axle and Armature Bearings

The Lead content, that we scientifically incorporate into this alloy, minimizes frictional wear, resulting in less frequent replacements. Finished oversize or undersize to a perfect running fit with your shafts.

Expertly machined in strict accordance with your specifications, even to the extent of incorporating special features therein, if so desired.

All Armature Bearings lined with our celebrated ARMATURE Babbitt Metal.

"Tiger" Bronze Axle and Armature Bearings insure maximum service under the hardest operating conditions.



ears of Service

Peirce Pins
Hubbard Turnbuckles

Hubbard Pole Bands With Pull-off Rods

Split Pole Bands

Hubbard Heavy Rolled Steel Guy Clamps

Peirce Forged Steel Pins

Just as the Electric Railway Industry has progressed from year to year—

—so has Hubbard Hardware and conditions in manufacturing methods.

Manufactured in four modern plants and designed by specializing engineers of wide experience, Hubbard Hardware has always been a pioneer in the development of new pole line materials. Hubbard Standard Pole Line Hardware, and Peirce Construction Specialties meet every requirement of the Electric Railway Industry.

Hubbard distribution is also an important factor! Handled by 170 responsible jobbers, strategically located throughout the country, who carry complete stocks of Hubbard Pole Line Hardware and Peirce Construction Specialties, immediate delivery is assured.

Because of excellence of quality and the exceptional combination of manufacturing and distributing service, Hubbard leads the list for the most complete and modern equipment.

The pole line hardware and construction specialties buying guide of the Electric Railways is the Hubbard Catalog.

Write for your copy today.

HUBBARD

The HARDWARE *makes the line*
Hubbard makes the HARDWARE

Hubbard *and* COMPANY

PITTSBURGH ⁂ OAKLAND, CAL. ⁂ CHICAGO

Differentials nearly always save enough money to pay for themselves in the first season's operation.

Differential Car Statistics

60 Railways operating Differential Electric Dump Cars.

300 Differential Electric Dump Cars in service.

24 Railways have given repeat orders. Many have repeated from 3 to 5 times.

Differential Electric Dump Cars place materials on the job at a gross cost of less than 2 cents per ton-mile.

THE DIFFERENTIAL CAR-WHEEL TRUCK AND TRACTOR—

A dual traction system for electric or steam shovels, concrete mixers, etc., which enables machine to travel on rails or on the ground. Several large railways have shown an increased capacity of 75%, at the same time cutting the labor force in half, when their electric shovels were mounted on this device.

THE CLARK CONCRETE BREAKER—

Breaks concrete at less than two cents per track foot. It is speedy and safe and protects manhole covers, conduits, underground mains, etc.

THE DIFFERENTIAL BOTTOM DUMP BALLAST CAR—

Discharges ballast in desired quantities. Motorman determines the flow of the material. Puts the ballast in desired place—between rails, at ends of ties, or spreads it over entire track area.

THE DIFFERENTIAL 3-WAY TRUCK BODY—

The truck body that dumps to both sides and to the rear. A single lever governs the direction of dumping and a single screw hoist, taking power from the transmission, furnishes the dumping force. Extremely valuable when track area is torn up for reconstruction. Has many uses the rear dump cannot fill.

It forms a valuable supplement to your Differential Cars.

DIFFERENTIAL ELECTRIC LOCOMOTIVE CRANE CAR

Capacity—5 tons at radii 3 ft. to 26 ft.
—2½ tons at radii up to 44 ft.

SPEEDY — SAFE — ONE MAN OPERATION.

Handles rail, special track work, poles, ties, bridge timbers, and clam-shell bucket work. Invaluable around yards and shops.

Conforms to all electric railway clearances and meets all requirements. Designed and constructed for electric railways.

The Differential Steel Car Co.

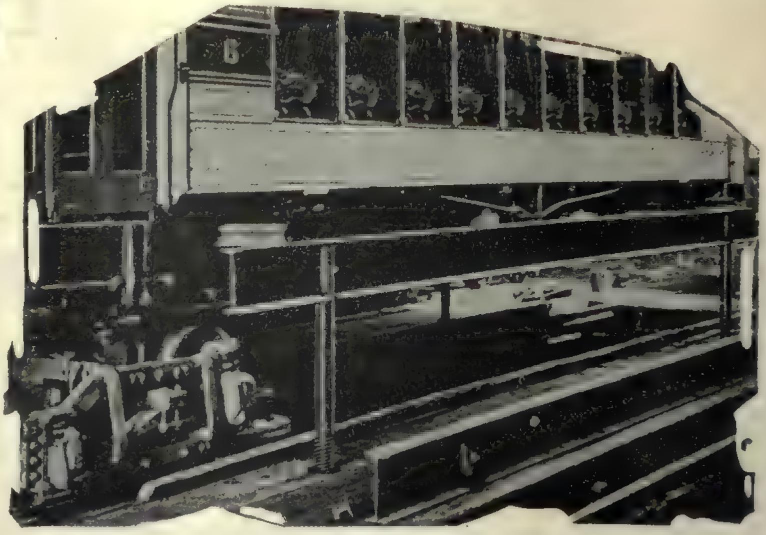
FINDLAY, OHIO

Columbia Armature and Field Coils

are made from the best grade of double cotton covered magnet wire and are moulded or pressed to accurate slot dimensions.

Columbia Armature, Axle and Journal Bearings

are made of a specially developed bearing bronze, known as **Columbia No. 1**, which has been adopted by a large number of roads as "standard" because of its long wearing qualities.



Columbia Electric Car Hoists

will raise a 50 ton car six feet in less than 5 minutes. It makes lifting easy, quick and efficient, saving workers' time and affords safety to pitmen and equipment.

Columbia Line Ears

are made of a specially developed composition metal. They withstand shocks of the wheel and pole; all kinds of weather; decomposition caused by electric arc and the clinching of the lineman's tools as he forces the wire into the groove of the ear.

Forgings

We are equipped to produce a wide variety of both light and heavy forgings. The Equalizer Bar and Brake Rigging illustrated are an example of the latter type. Produced to blue print and specifications.

Columbia Trolley Wheels, Poles and Harps

are of the highest grade workmanship. The wheels combine the essentials of ample conductivity, with proper hardness for minimum wear on wire and for the purpose of securing maximum wheel mileage. The Poles and Harps are built to meet the requirements. They are light, yet strong and dependable.

Columbia Standard Fingers and Segment Burning Tips

Control Fingers are of the removable tip type and are interchangeable with the non-removable tip type. Their construction insures good contact with the shunt finger spring. The Burning Segment Tips are made for all types of service. They are made to allow quick replacement whenever contact is broken or worn.

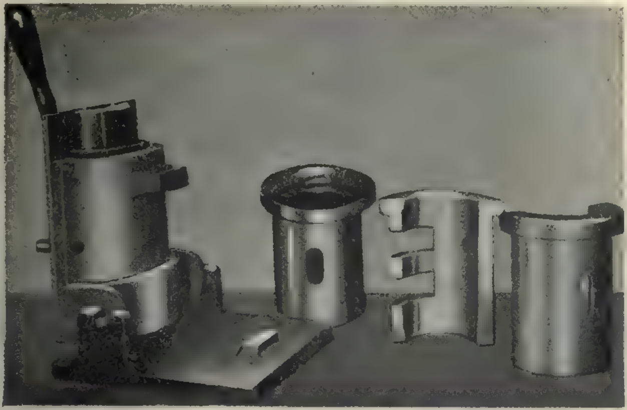
The

COLUMBIA MACHINE WORKS & M. I. CO.

265 Chestnut St., corner Atlantic Ave.
Brooklyn, N. Y.

Columbia Babbitting Moulds

The only device which will babbitt axle bearing halves in center and make same strictly interchangeable.



Columbia Controller Handles

Fit all makes and types of controllers. Made of brass, or malleable iron.

Armature Banding and Heading Machine

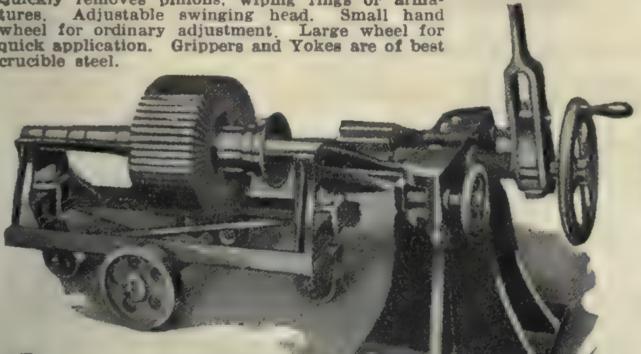
Self contained and instantly adjusted tension and feeding attachment. No straddling of wire by operator. Worm drive enclosed in air tight, dust proof case. All bearings bronze.

All Steel Gear Case

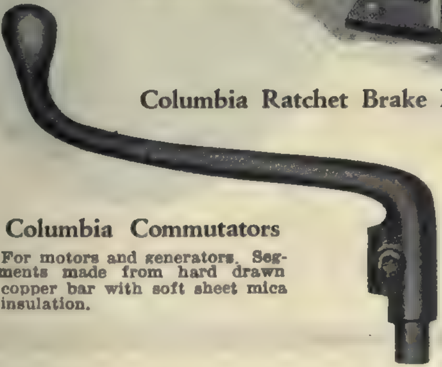
Absolutely oil, water and dust tight. Top and bottom are flanged over sides and ends with brackets bent over sides to remove all strain from rivets.

Pinion Puller

Quickly removes pinions, wiping rings or armatures. Adjustable swinging head. Small hand wheel for ordinary adjustment. Large wheel for quick application. Grippers and Yokes are of best crucible steel.



Columbia Ratchet Brake Handles

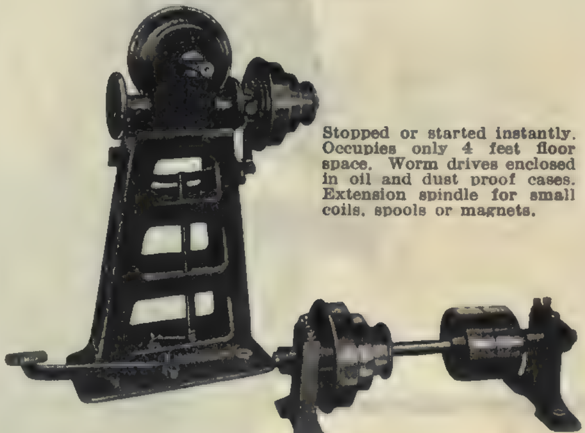


Automatically holds the chain taut at the point to which motorman has pulled it. No Pawl for motormen to kick loose for releasing. Made in brass or malleable iron.

Columbia Commutators

For motors and generators. Segments made from hard drawn copper bar with soft sheet mica insulation.

Winding Machine for Armature and Field Coils



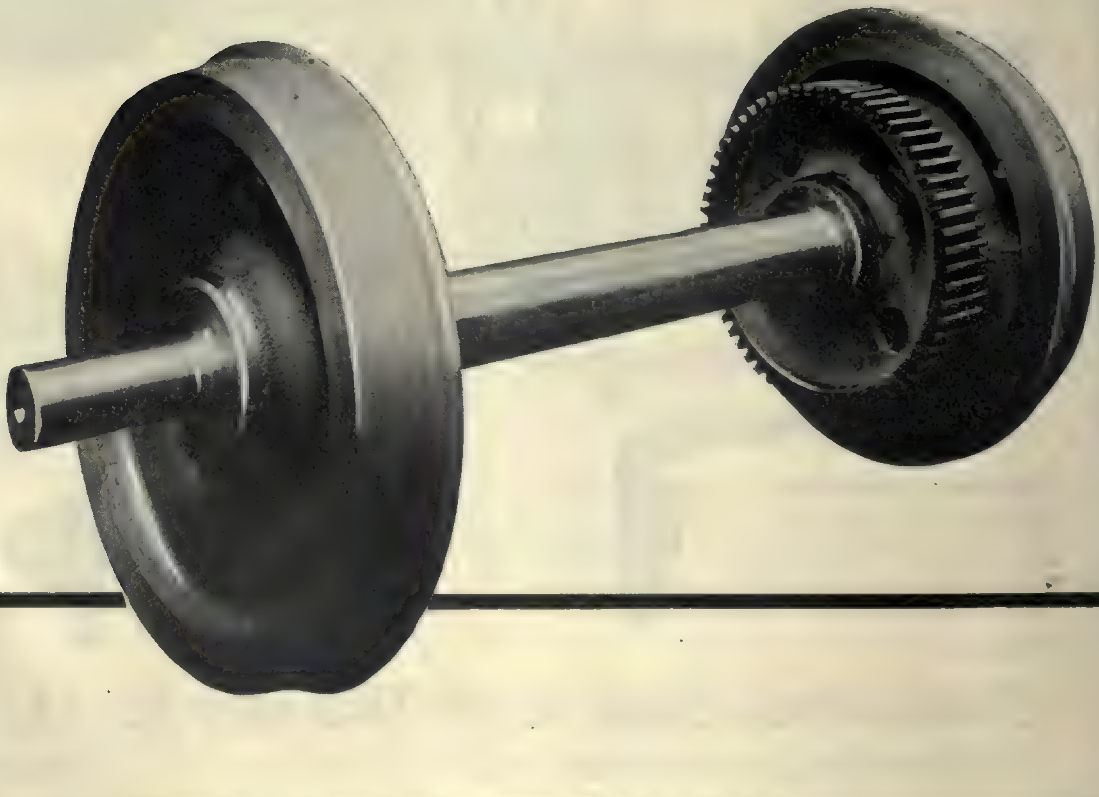
Stopped or started instantly. Occupies only 4 feet floor space. Worm drives enclosed in oil and dust proof cases. Extension spindle for small coils, spools or magnets.

The

COLUMBIA MACHINE WORKS & M. I. CO.

265 Chestnut St., corner Atlantic Ave. Brooklyn, N. Y.

For every
In every



type of car—
type of service—

"Standard" materials are helping to maintain efficient transportation. With a background of long experience in the making of our own steel and the manufacture of materials, by the careful supervision given all work, and the rigid inspection placed upon it, we are in a position to offer the railways the best that can be produced.

STANDARD STEEL
WORKS COMPANY
PHILADELPHIA, PA.

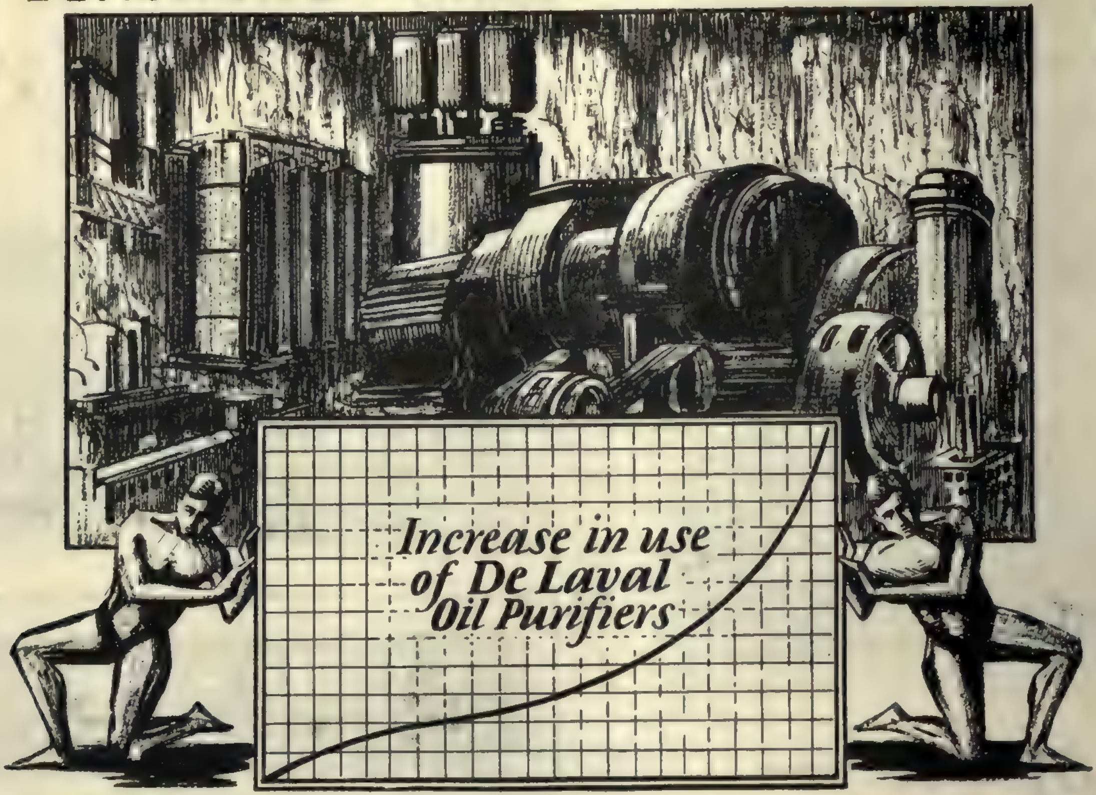
BRANCH OFFICES:
CHICAGO
ST. LOUIS
NEW YORK
HOUSTON, TEXAS
PORTLAND, ORE.
RICHMOND, VA.
SAN FRANCISCO
ST. PAUL, MINN.
PITTSBURGH, PA.
WORKS: BURNHAM, PA.

Rolled Steel Wheels
Coil and Elliptic Springs

SS

Quenched and Tempered Carbon Steel Axles
Armature Shafts

ELIMINATE WASTE IN INDUSTRY


Increase in use of De Laval Oil Purifiers

Why this swing to oil purification--?

The phenomenal progressiveness of American engineering has fostered the development of a long list of modern necessities. Myths a few years back, today they are vital.

But anxiety to lead the world's developments has engendered neglect of the foundation that made this development possible. There has been deliberate waste of materials capable of great savings.

The time has come when American industry must conserve its naturally rich resources, to eliminate wanton waste. Parallel with the need, is the De Laval Oil Purification system to meet the demand.

Covering every department of oil usage; cutting oil, lubricating oil, transformer and switch oil and fuel oil; proven installations in every field attest the progressiveness of these dollar saving, waste eliminators.

Savings not only of oil, but of increased bearing life from clean lubricants, of faster cutting speeds in machine shops, and greater transmission efficiency from clean transformer oil.

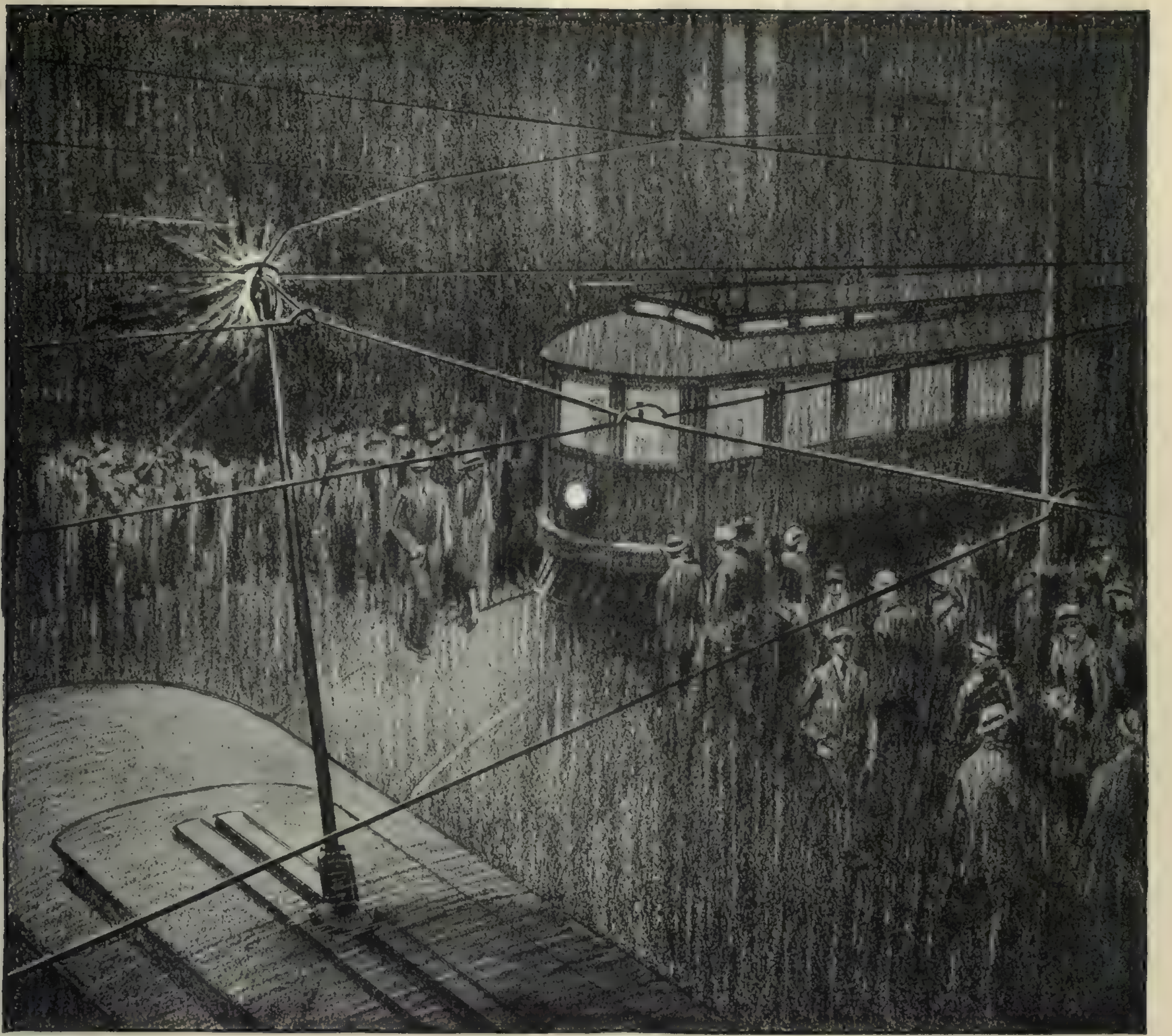
Designing and operating engineers, presidents and their assistants, decision men in charge of industrial pioneering and consolidation will appreciate the excellent facilities of De Laval Engineering Service, supported by publications and research, in the solution of their problems involving the use of oil.

Please address all inquiries to Department R.

The De Laval Separator Company
165 Broadway, New York
6 Jackson Blvd., Chicago
DE LAVAL PACIFIC COMPANY
San Francisco

De Laval Oil Purifiers

Types for Lubricating Oil, Fuel Oil,
Transformer and Circuit Breaker Oil, Crankcase Oil



Hitenso for Strength

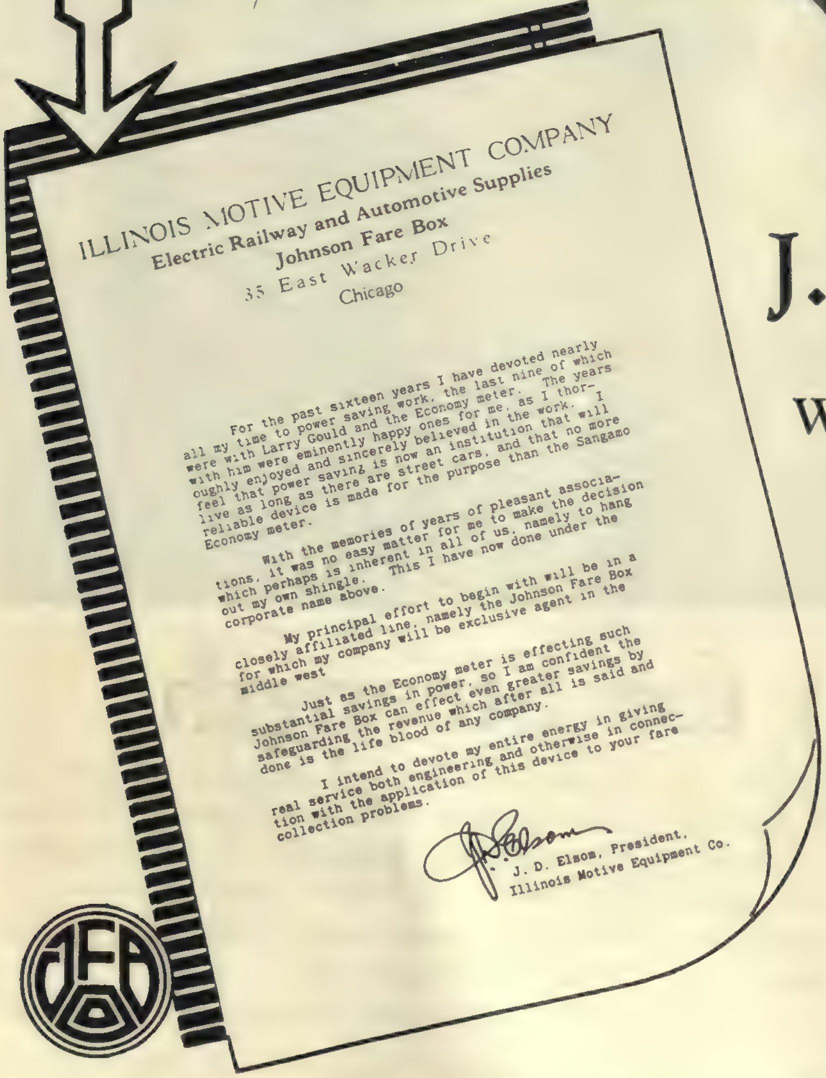
STRENGTH—a minimum of 79,000 pounds per square inch, for 00 size—with the least sacrifice in conductivity is available only in Hitenso.

Hitenso "C" meets the strength requirements of the A.S.T.M. specifications for High Strength Bronze and exceeds the conductivity by 15%. Hitenso "A" meets the specifications for Medium Strength Bronze and exceeds the conductivity by 15%. In terms of electrical efficiency Hitenso "C" is 37½% better than High Strength Bronze and Hitenso "A" 23% better than Medium Strength Bronze.

Where operating conditions are severe, Hitenso Trolley Wire, exclusively an Anaconda Product, serves best. Complete imformation upon request.

ANACONDA COPPER MINING CO. THE AMERICAN BRASS COMPANY
Rod, Wire and Cable Products
General Offices: 25 Broadway, New York Chicago Office: 111 W. Washington St.

ANACONDA TROLLEY WIRE



ILLINOIS MOTIVE EQUIPMENT COMPANY
Electric Railway and Automotive Supplies
Johnson Fare Box
35 East Wacker Drive
Chicago

For the past sixteen years I have devoted nearly all my time to power saving work, the last nine of which were with Larry Gould and the Economy meter. The years with him were eminently happy ones for me, as I thoroughly enjoyed and sincerely believed in the work. I feel that power saving is now an institution that will live as long as there are street cars, and that no more reliable device is made for the purpose than the Sangamo Economy meter.

With the memories of years of pleasant associations, it was no easy matter for me to make the decision which perhaps is inherent in all of us, namely to hang out my own shingle. This I have now done under the corporate name above.

My principal effort to begin with will be in a closely affiliated line, namely the Johnson Fare Box for which my company will be exclusive agent in the middle west

Just as the Economy meter is effecting such substantial savings in power, so I am confident the Johnson Fare Box can effect even greater savings by safeguarding the revenue which after all is said and done is the life blood of any company.

I intend to devote my entire energy in giving real service both engineering and otherwise in connection with the application of this device to your fare collection problems.

J. D. Elsom, President,
Illinois Motive Equipment Co.

J. D. ELSOM
is now
Western Representative

For more than sixteen years, Mr. Elsom has been handling power-saving devices and equipment for street railways. Principal amongst these devices has been the Sangamo Economy Meter.

It seems quite fitting then that such a man should take over the distribution, in the middle west, of an economy and efficiency device like the Johnson Fare Box, which not only greatly simplifies the operation of the car itself, but also safeguards the revenue which, after all, is the life blood of any company.

Mr. Elsom is prepared to render real service on the application of this device, to your collection problems.

JOHNSON FARE BOX CO.

WESTERN REPRESENTATIVE
Illinois Motive Equipment Company, Chicago, Illinois

LOS ANGELES

Indianapolis Norfolk and Duluth Purchase 2000 Johnson Fare Boxes

These four well-known Street Railway companies installed Johnson Fare Boxes on their cars because they had proven by actual test that their use increased the efficiency of the platform men—reduced the loading time and accelerated the schedule—gained the confidence of the riding public—made fare collection inspection easier and more positive, and increased the revenue turn-in from 3% to 10%.

JOHNSON ELECTRIC TYPE FULL AUTOMATIC FARE BOX

which registers *every* fare electrically, *instantaneously,* and audibly by means of the coin itself which the passenger places in the box. The human element has been displaced by positive registration of fares that *instantly* tell conductor, passenger, and company that the fare has been paid and *recorded.*

This fare box has been skillfully designed, and honestly built to meet every purpose which prompted its existence—

"To accurately register all the fares collected *instantly,* audibly, and visibly."

The price is as low as Johnson reliability can be produced, even with the advantages of large output.

You are paying for Johnson Fare Boxes whether you use them or not, since the losses through a faulty or inferior system, will pay for the installation of Johnson Fare Boxes, which collect and register *all* the fares.

Remember this fact—The Johnson Fare Box Company has *never* built a non-registering Fare Box.

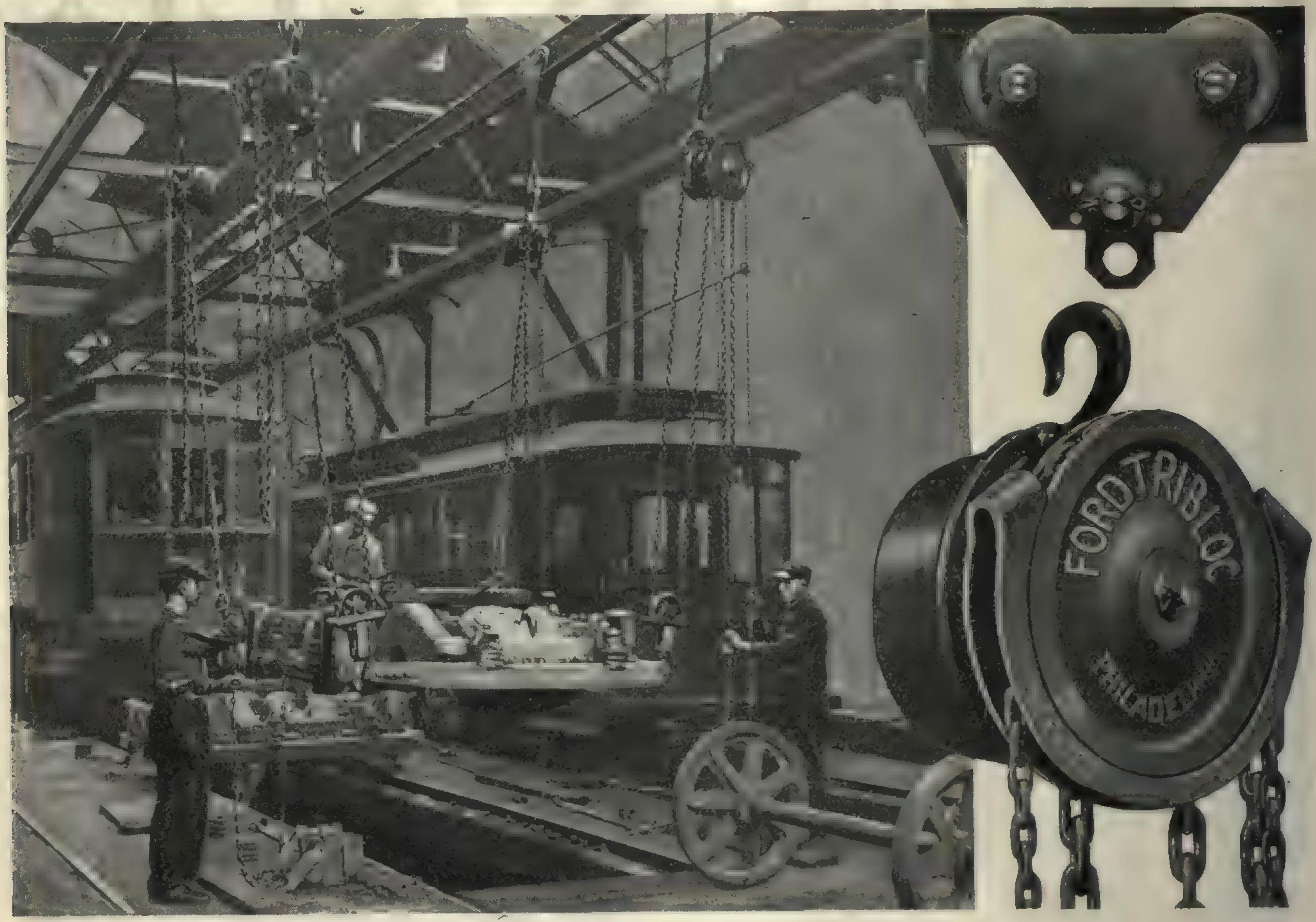
Electro-magnet type of fare box—NOT motor driven; no drain on battery.

JOHNSON FARE BOX CO.

CHICAGO, ILL.
4619 Ravenswood Ave.

NEW YORK, N. Y.
2 W. 61st St.

FORD CHAIN HOISTS and TROLLEYS



Lower costs this way

Lowering the cost of passenger transportation on the road is vital. Less costly *load transportation in the shop* is also highly important.

Extreme load, durability and efficiency tests have proved the remarkable economy of Ford Tribloc Chain Hoists for most any sort of a load lifting job—the kind of a hoist to tie to. Use them in your car shops and bus garages—they'll soon prove their worth by the time and labor they save.

Made of malleable iron and drop forged steel, with every part machined and interchangeable, Tribloc Chain Hoists provide an efficiency of 80% *throughout their life.* Put them on the hardest work you have—show them no favors—and their remarkable endurance will surprise you.

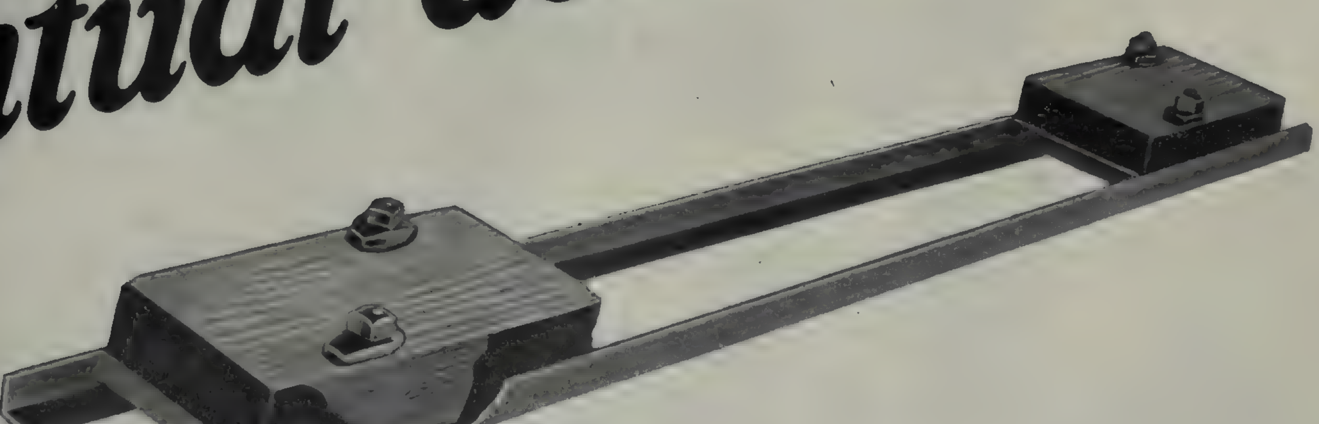
Send for Catalog 7-B.

FORD CHAIN BLOCK COMPANY
2nd and Diamond Sts. Philadelphia, Pa.

We also manufacture "THE MOTORBLOC"—*an electrically driven chain hoist.*

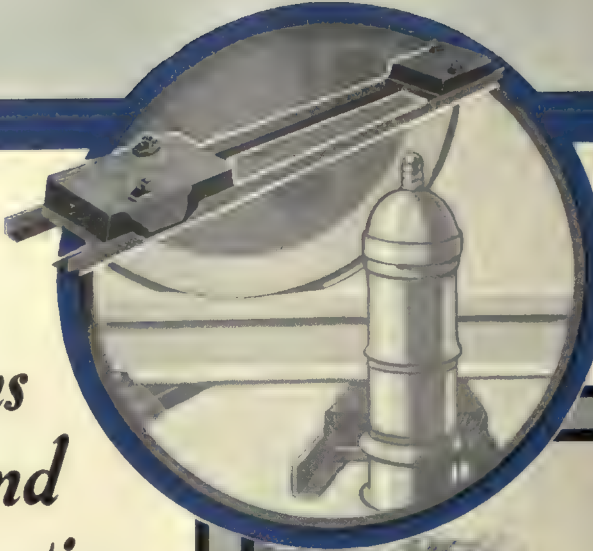
Stop

this utual destruction



The Dayton Mechanical Tie Co.,
Dayton, Ohio

Dayton Ties Forestall the Vicious Circle of Track and Rolling Stock Destruction



Dayton Ties Put Shock Absorbers Under Your Track

Too well you know the vicious circle of track and rolling stock destruction. They react on each other to the rapid deterioration of both.

Once the vicious circle starts, it is well nigh impossible to stop it. But you can defer its beginning fifteen to twenty-five years by putting down Dayton Tie Tracks.

"Shock Absorber" track laid on Dayton Ties fifteen years ago is as smooth today as ever—looks good for an indefinite period, and has not cost a penny for maintenance.

Just a few hundred feet of this track will convince you we have the cure for the vicious circle—try it.

The Dayton Mechanical Tie Co.,
Dayton, Ohio.

WHARTON

Special Trackwork

Switches—Frogs—Mates—Crossovers

Shown by Statistics!

STATISTICS carefully prepared and kept by users of Wharton Special Trackwork show for such track a trend of remarkable stability and long life over a period of many years and under most severe traffic conditions.

The unusual serviceability and marvelous wear-resisting qualities of the well-known *Tisco* Manganese Steel have been big factors in keeping down maintenance of way costs.

Calls upon our Engineering Department, with their many years' experience solving Trackwork problems, are welcomed.

Wm. Wharton Jr. & Co., Inc.
Easton, Pa.

Sales Offices:

Boston, Chicago, San Francisco, New York, Montreal, El Paso, Philadelphia, Scranton, Pittsburgh.

TISCO

EMPIRE BOLTS & NUTS

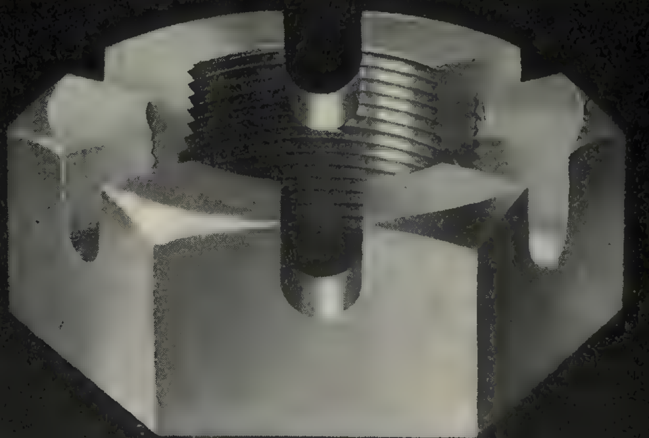
BUS transportation has developed a new problem in maintenance—*the rapid wear of parts that in ordinary automotive service were good enough.* The "good enough" bolts and nuts of yesterday wear away like putty under the terrific punishment of continuous high speed bus service. Specify EMPIRE Bolts and Nuts in all your shops. The difference in overhaul time will interest you.

All good jobbers and mill supply houses carry the eighty-year old EMPIRE brand.

Or we will send samples on request.

PRECISION OF FIT

STRENGTH OF THREAD



ACCURACY OF FINISH

PERFECT HEX

RUSSELL, BURDSALL & WARD
BOLT & NUT COMPANY
PORT CHESTER, N.Y.

Branch Office: Straus Building CHICAGO
Branch Office: General Motors Bldg. DETROIT
Branch [illegible] Factory: ROCK FALLS, Ills.
[illegible] & [illegible] [illegible] Jackson Street SEATTLE
[illegible] & [illegible], Inc. 158-168 Eleventh Street SAN FRANCISCO

Resiliency

QUALITY TIES
Ready for Shipment
Now

Noiseless Operation

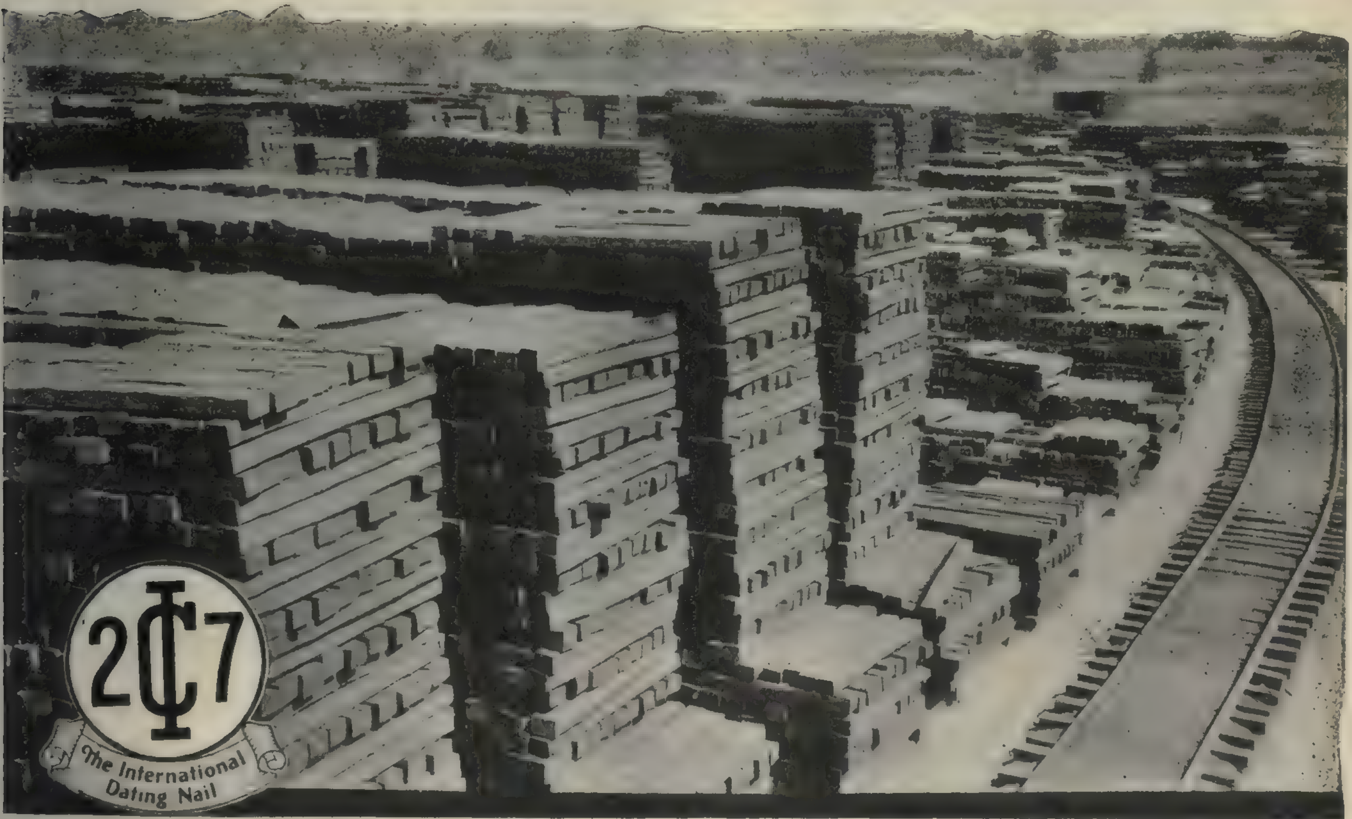
TO USE *International* Creosoted Ties is to insure quiet, smooth running operation of cars. These wooden ties deaden disagreeable rumblings and clashing sounds at joints and special work. Their ability to last for many years means that they maintain the line and surface of rails at all times.

All timber is carefully selected and well seasoned. After which it is thoroughly treated with creosote oil under a pressure that drives the oil deeply into the wood—thus preventing decay.

International Creosoted Ties are properly graded, plainly marked and then stamped with a copper monogrammed dating nail which serves as a permanent record for service inspections

Large stocks enable us to make prompt deliveries anywhere in the United States. Send for quotations.

International Creosoting & Construction Co.
General Office—Galveston, Texas
Plants: Texarkana Beaumont Galveston



International HIGH GRADE CREOSOTED TIES

CAMBRIA ROLLED STEEL WHEELS and FORGED STEEL AXLES

Cambria rolled steel wheels and forged steel axles are manufactured in the Cambria Plant of the Bethlehem Steel Company in Johnstown, Pa.

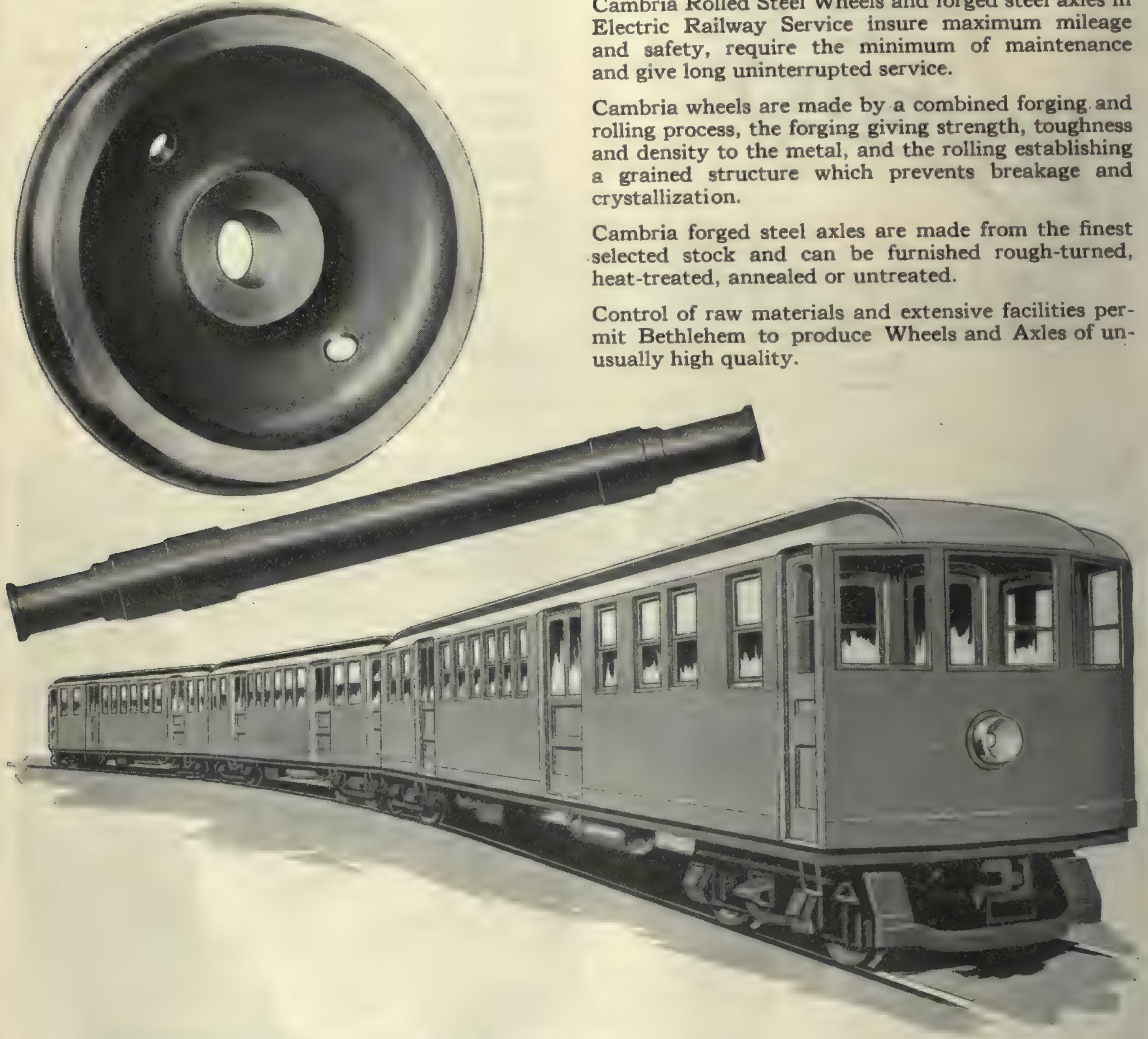
LONG SERVICE *and* MINIMUM MAINTENANCE

Cambria Rolled Steel Wheels and forged steel axles in Electric Railway Service insure maximum mileage and safety, require the minimum of maintenance and give long uninterrupted service.

Cambria wheels are made by a combined forging and rolling process, the forging giving strength, toughness and density to the metal, and the rolling establishing a grained structure which prevents breakage and crystallization.

Cambria forged steel axles are made from the finest selected stock and can be furnished rough-turned, heat-treated, annealed or untreated.

Control of raw materials and extensive facilities permit Bethlehem to produce Wheels and Axles of unusually high quality.



BETHLEHEM STEEL COMPANY, *General Offices:* BETHLEHEM, PA.

DISTRICT OFFICES:

New York Boston Philadelphia Baltimore Washington Atlanta Pittsburgh Buffalo Cleveland Detroit Cincinnati Chicago St. Louis San Francisco Seattle Los Angeles Portland

Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporter of our Commercial Products

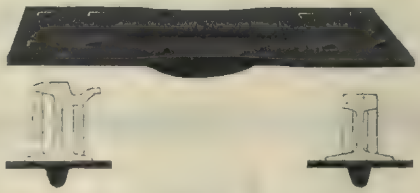
BETHLEHEM

BETHLEHEM RAILWAY PRODUCTS and SPECIAL TRACKWORK

A Few Bethlehem Railway Products

for Electric Railways include Tee and Girder Rails; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Alloy Steel Crossings; Abbott and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates and Pole Line Material.

Abbott Base Plate

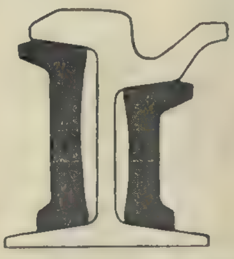


Center Rib Base Plate

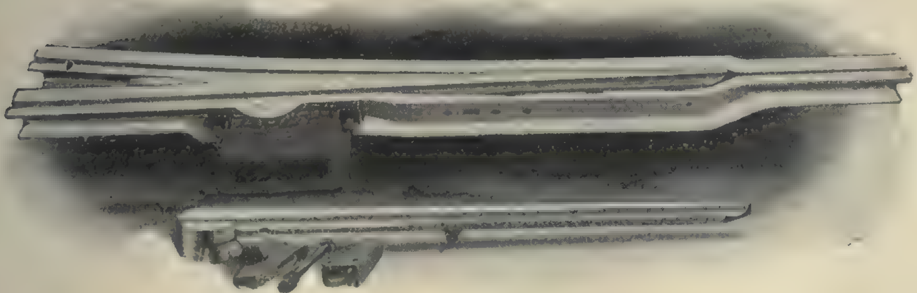
All materials, rails, plates, bars, forgings, castings, bolts, etc., are made in Bethlehem Plants—from ore to finished product under Bethlehem constant supervision.

Great care and attention is given to special layouts. Before shipment layouts are assembled to make sure that they will correctly meet conditions in the field.

The fitting up work is done under roof where workmen are shielded from inclement weather, thus enabling them to do accurate work.



Bethlehem Special Welding Plate, Design 407 B



Solid Manganese Tongue Switch, Design 905

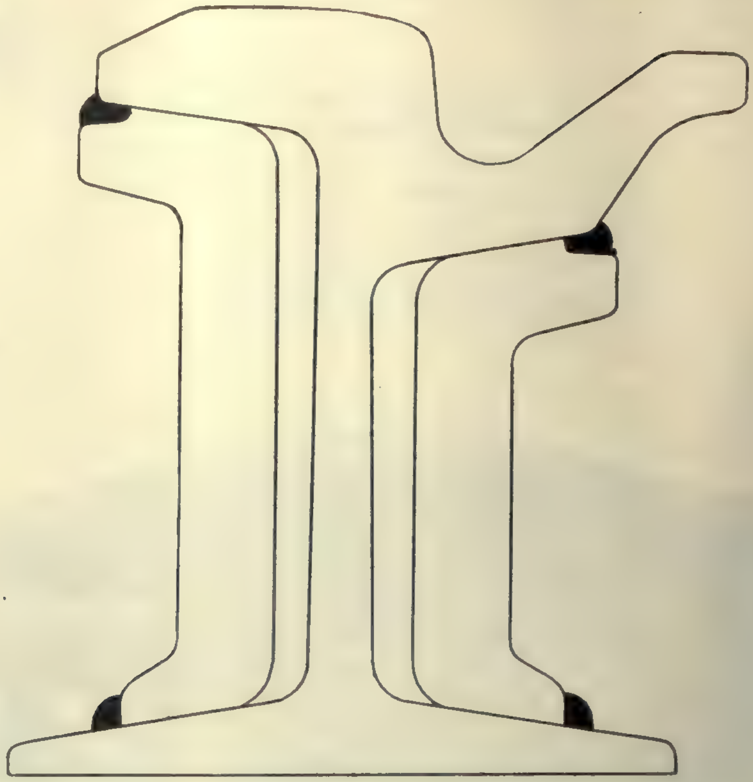
BETHLEHEM STEEL COMPANY, *General Offices:* BETHLEHEM, PA.

DISTRICT OFFICES:

New York Boston Philadelphia Baltimore Washington Atlanta Pittsburgh Buffalo Cleveland
Detroit Cincinnati Chicago St. Louis San Francisco Seattle Los Angeles Portland

Bethlehem Steel Export Corporation, 25 Broadway, New York City, Sole Exporter of our Commercial Products

BETHLEHEM



"WELD PLATES"

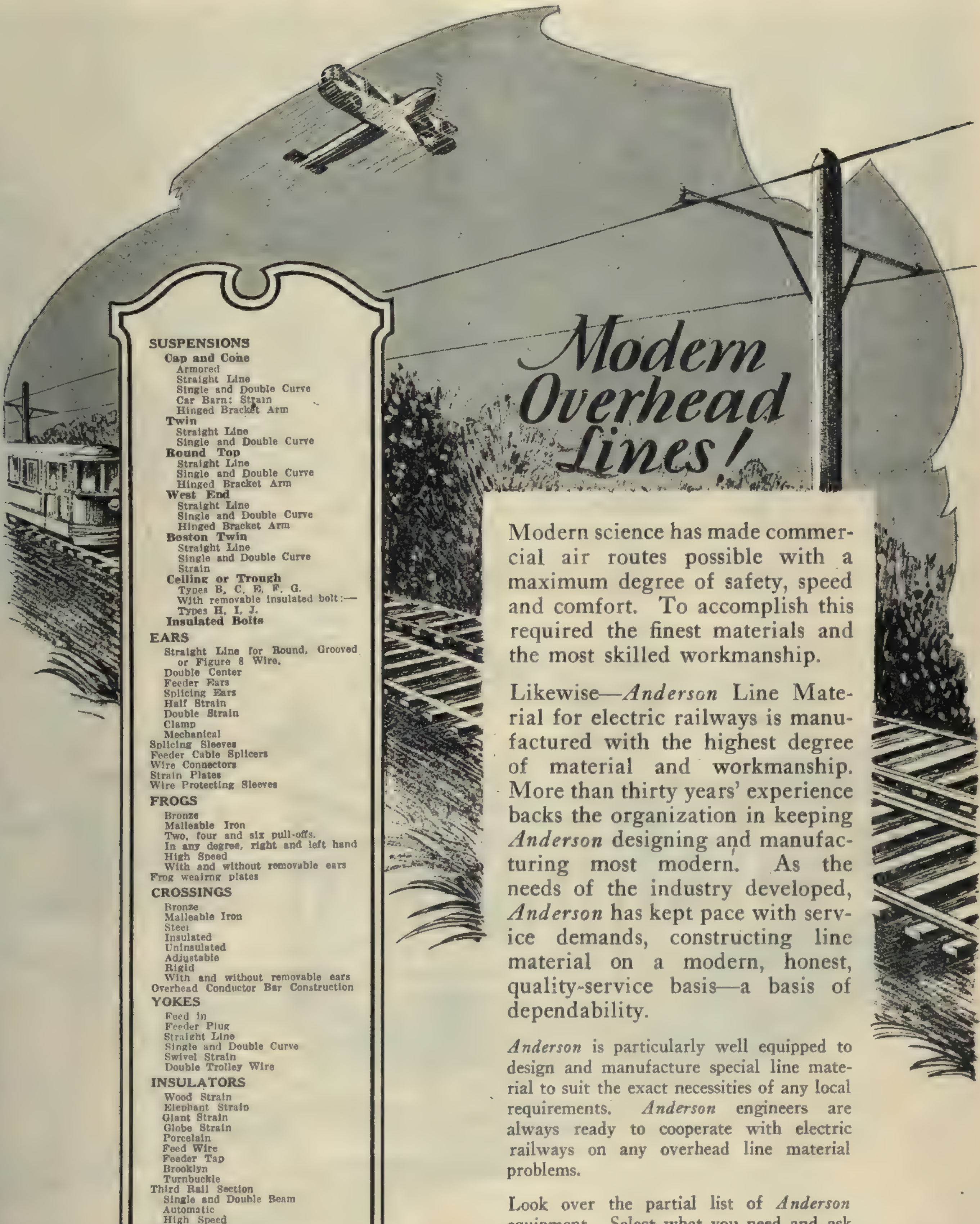
for
EFFICIENT, ECONOMICAL
JOINTS!

Do you believe in statistics? Rely on performance records? If so the performance records of the many "Weld Plates" now in use will convince you that they lead the bar-weld joints in efficiency and economy.

"Weld Plates" represent the most modern welding practice. They are the strongest and most up-to-date plates rolled especially for electric welded joints. Note the shape—the grooves for retaining plenty of weld metal along the upper edges—the wide contact areas at top and bottom—the suitability for the use of short bolts.

A trial will convince you of their efficiency and economy.

THE RAIL JOINT COMPANY
165 Broadway, New York


Modern Overhead Lines!

SUSPENSIONS
- **Cap and Cone**
  - Armored
  - Straight Line
  - Single and Double Curve
  - Car Barn: Strain
  - Hinged Bracket Arm
- **Twin**
  - Straight Line
  - Single and Double Curve
- **Round Top**
  - Straight Line
  - Single and Double Curve
  - Hinged Bracket Arm
- **West End**
  - Straight Line
  - Single and Double Curve
  - Hinged Bracket Arm
- **Boston Twin**
  - Straight Line
  - Single and Double Curve
  - Strain
- **Ceiling or Trough**
  - Types B, C, E, F, G.
  - With removable insulated bolt:—
  - Types H, I, J.
- **Insulated Bolts**

EARS
- Straight Line for Round, Grooved or Figure 8 Wire.
- Double Center
- Feeder Ears
- Splicing Ears
- Half Strain
- Double Strain
- Clamp
- Mechanical

Splicing Sleeves
Feeder Cable Splicers
Wire Connectors
Strain Plates
Wire Protecting Sleeves

FROGS
- Bronze
- Malleable Iron
- Two, four and six pull-offs.
- In any degree, right and left hand
- High Speed
- With and without removable ears

Frog weairng plates

CROSSINGS
- Bronze
- Malleable Iron
- Steel
- Insulated
- Uninsulated
- Adjustable
- Rigid
- With and without removable ears

Overhead Conductor Bar Construction

YOKES
- Feed in
- Feeder Plug
- Straight Line
- Single and Double Curve
- Swivel Strain
- Double Trolley Wire

INSULATORS
- Wood Strain
- Elephant Strain
- Giant Strain
- Globe Strain
- Porcelain
- Feed Wire
- Feeder Tap
- Brooklyn
- Turnbuckle

Third Rail Section
- Single and Double Beam
- Automatic
- High Speed

Split Spools
Solid Spools
Overhead material for Bridges
Line Material for Cranes
Sectionalizing Switches
Trolley Wheels
Sleet Wheels and Cutters
Harps
Pole Bands
Eye Bolts
Insulator Pins
Tools for installing overhead material

Modern science has made commercial air routes possible with a maximum degree of safety, speed and comfort. To accomplish this required the finest materials and the most skilled workmanship.

Likewise—*Anderson* Line Material for electric railways is manufactured with the highest degree of material and workmanship. More than thirty years' experience backs the organization in keeping *Anderson* designing and manufacturing most modern. As the needs of the industry developed, *Anderson* has kept pace with service demands, constructing line material on a modern, honest, quality-service basis—a basis of dependability.

Anderson is particularly well equipped to design and manufacture special line material to suit the exact necessities of any local requirements. *Anderson* engineers are always ready to cooperate with electric railways on any overhead line material problems.

Look over the partial list of *Anderson* equipment. Select what you need and ask for latest quotations.

Albert & J. M. Anderson Mfg. Co.
289-305 A St., Boston, Mass.
Philadelphia—129 Real Estate Trust Bldg. **New York—135 Broadway**
Chicago—105 S. Dearborn St. **London, E. C. 2, 12 Moor Lane**

Car Card Advertising

1927 comes as another year of opportunity for the Electric Railway Industry, and with its coming we wish our friends a generous share of its promised benefits.

Each year the Street Railways which pioneered and opened up new territories are proving more and more useful in the community life through better service to the people.

In what more fitting manner can we contribute to the general prosperity than by putting forth our best efforts to maintain Collier Service as an attractive feature and an active asset of the Electric Railway Service?

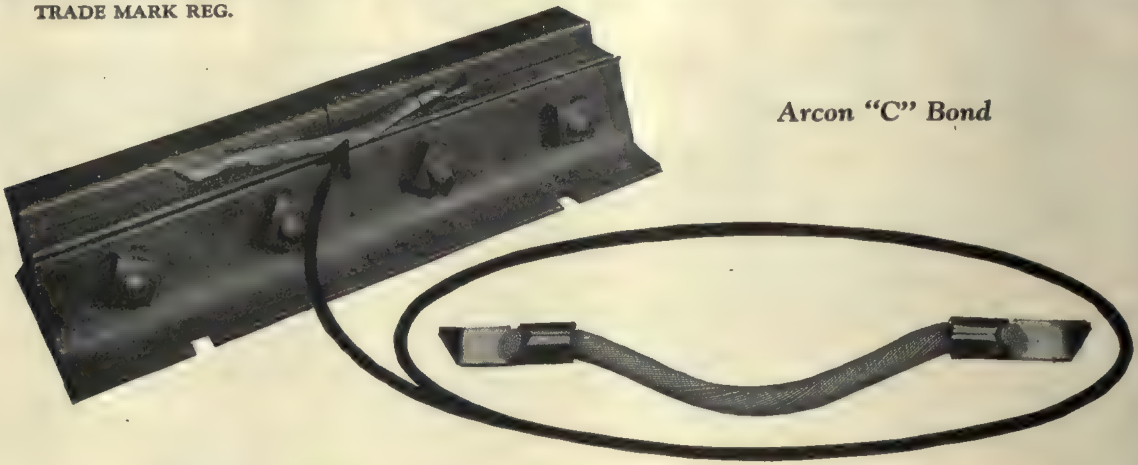
Barron G. Collier
INCORPORATED,

CANDLER BUILDING, 220 W. 42d ST.
NEW YORK, N. Y.

lmost everywhere!

ARCON RAIL BONDS

TRADE MARK REG.



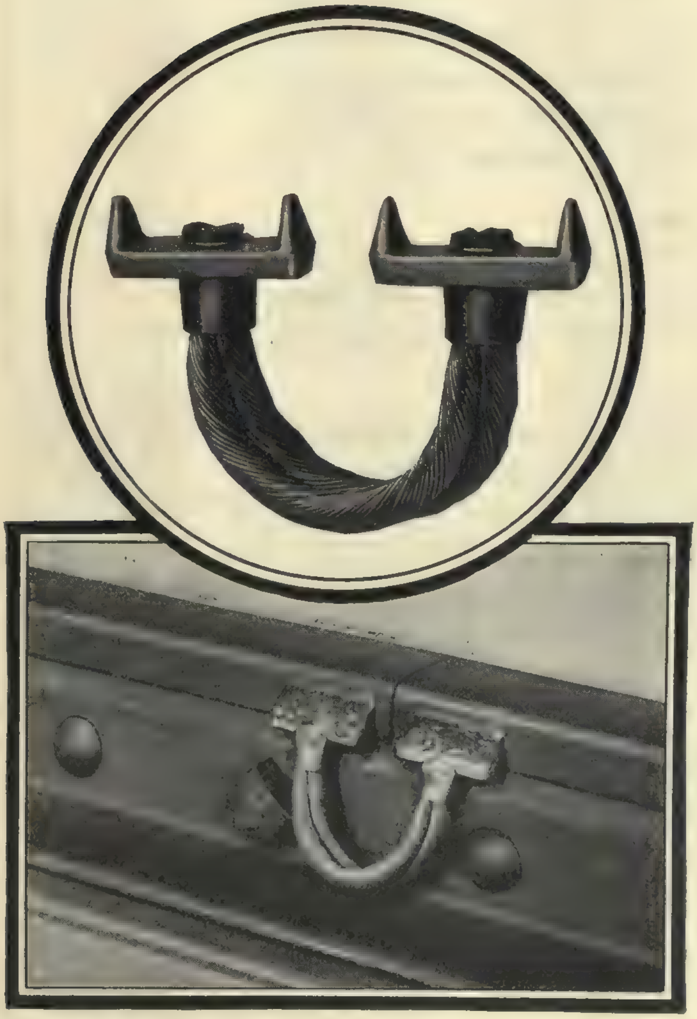
Arcon "C" Bond

The Arcon "C" Bond in detail, and its application to Weber Joint is shown above.

The application of this bond is simple and effective. All parts of the terminal and rail are accessible. The weld is accomplished easily and quickly.

The open shape of the Arcon "A" terminal is especially desirable since the arc can be directed freely upon the conductor at the junction of the terminal and the rail.

Prices and descriptive literature sent on request.



Arcon "A" Bond

AMERICAN STEEL & WIRE COMPANY

Sales Offices

Chicago New York Boston Cleveland Worcester Philadelphia Pittsburgh Buffalo Detroit Cincinnati Baltimore
Wilkes-Barre St. Louis Kansas City St. Paul Oklahoma City Birmingham Memphis Dallas Atlanta Denver Salt Lake City
Export Representative: U. S. Steel Products Co., New York
Pacific Coast Representative: U. S. Steel Products Company, San Francisco, Los Angeles, Portland, Seattle

IT'S LIGHT ON DUFF JACKS

DUFF JACKS meet every modern lifting requirement. They embody the most advanced improvements in every instance . . . the result of forty years of experience devoted exclusively to jack making. The superior knowledge exemplified in design, materials and manufacturing process, expands the meaning of "IT'S LIGHT ON DUFF JACKS" to more than a slogan of capacity.

"IT'S LIGHT ON DUFF JACKS" also means lower first cost, reduced labor and time costs and practically no maintenance.

DUFF "Governor Controlled" Self Lowering Jacks

15 to 50 Tons Capacities

These jacks effect profitable savings in time and labor due to unusual efficiency and ease of operation.

Governor Control of lowering speed (exclusive Duff patents) insures absolute safety under all conditions.

Adaptable for heavy lifting duty of every character.

DUFF High Speed Ball Bearing Screw Jacks

50 and 75 Tons Capacities

Powerful jacks designed especially for lifting locomotives. Also well adapted for all sorts of industrial heavy lifting. Operation easy, and action rapid for tools of their capacity.

DUFF Low Height Ball Bearing Screw Jacks (Journal Jacks)

15, 25 and 35 Tons Capacities

For lifting and adjusting low-set loads, tanks, structural material, etc. A built-in positive stop feature prevents raising standard out of base. Unusually light in weight with ample factor of safety for their rated capacities.

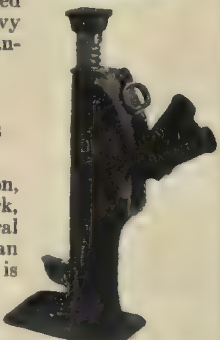
The DUFF Pinion Puller

Simplest, quickest, and most positive tool ever developed for use in repair shops, power houses, mines, mills, Street Railway Shops, Industrial Plants—any place where motors and gears or pinions are used. Placing and operating conveniently handled by one man.

DUFF (Genuine Barrett) Geared Automatic Lowering Jacks

25 Ton Capacity

These jacks afford lighter weight, absolutely positive action, and a substantially increased factor of safety. There are no intricate parts to wear out or break. Leverage compounded by gears making easy lifting of heavy loads. Convenient for the rapid handling of all sorts of heavy loads.

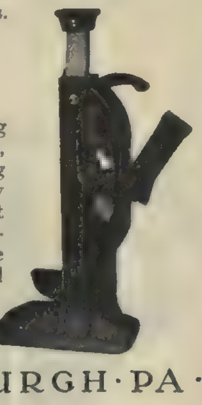


DUFF (Genuine Barrett) Automatic Lowering Jacks

5, 10 and 15 Tons Capacities

Rugged jacks used for construction, wrecking, bridge building, car work, machinery handling, and other general lifting and moving purposes where an especially powerful ratchet jack is required.

10 and 15-ton sizes equipped, when desired, with double socket lever, which enables convenient and effective operation in close, cramped quarters.



DUFF (Genuine Barrett) Track Jacks

15 Ton Capacity

Recognized as standard by leading railroads of the world for construction, surfacing, repairing, and ballasting work. They provide greatest capacity with lightest weight. Ruggedly built for lasting service, practically eliminating maintenance expense. Single Acting type No. 117 is illustrated to the right.

Write for Detailed Literature on Jacks in which you are especially interested

THE DUFF MANUFACTURING COMPANY - PITTSBURGH · PA ·
Est: 1883

DUFF JACKS

What "per car mile" statistics do *not* show

It has been the aim of operators of electric railways, especially during the past few years, to materially reduce operating expenses "per car mile."

But does a reduction in any individual account really mean a reduction in the aggregate of expense? Take, for instance, "lubrication." Does showing a "per car mile" reduction in lubricating expense really mean a reduction in total operating expenses "per car mile"? Theoretically, and as shown by the statistics it does. Actually, in too many instances, this is not so.

There is always a temptation to produce a low cost for lubricants at the expense of repairs which are not usually shown up so clearly in the shape of definite figures.

Stop a moment and think how much money is spent every year for new journal brasses, babbitting axle and armature

TEXACO

REG. U.S. PAT. OFF.

TEX

THE TEXAS COMPAN

OFFICES IN AL

bearings, winding armatures because they went down on the pole pieces, putting new rings in compressor pistons, or new pinions on the motors! And think, too, of the "pull-ins" because the door engines got stuck or the controller fingers short-circuited from improper contact *caused by poor lubrication.*

If these and many other costly failures could be reduced or eliminated, would it be reflected in "lubricating cost per car mile"? Would it be reflected in the total operating expense? And getting the right kind of lubrication to produce these savings in maintenance costs does not mean, necessarily, that the cost for lubricants is going up. If the right sort of lubricants are selected and if the quantities previously used have not been cut down below the safe limit, lubrication costs may even be lowered and the saving in maintenance costs secured at the same time.

A fully qualified *Texaco* engineer will gladly make a survey of your system. His recommendations will provide for lubrication with oils and greases of known quality, and with a full guarantee of satisfactory service. He will suggest the right kind and quantities to use, the best methods of application and further, if desired, he will instruct your maintenance force in the most convenient methods of getting effective results.

This is the practice followed by many of the largest and most successful electric railway operators in the country today, in reducing operating expenses *"per car mile."*

The Chosen Lubricants of Electric Railways

ACO

17 Battery Place, New York City
PRINCIPAL CITIES

TEXACO
REG. U.S. PAT. OFF.

A Railway Resistor – so light a boy can carry

Dissipates 3600 watts, yet weighs only 35 lb.

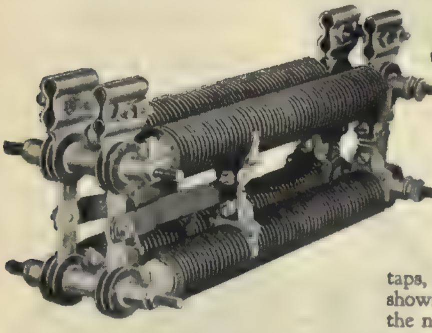
THIS Monitor Edgewound Railway Resistor, complete with frame, weighs 35 lb. It can easily be carried by a boy. A cast-iron grid resistor of the same watts rating (3600) weighs over twice as much.

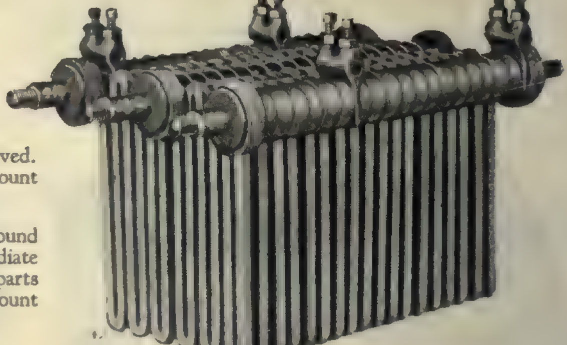
Eighteen grids, connected two in multiple, compose the cast-iron resistor. Four Edgewound units, connected two in multiple, compose the Edgewound Resistor. Figure for yourself the number of joints in each case. Each joint in the Edgewound resistor is independent of the others, permanently tight, of great mechanical strength — an assurance against loose connections. Tap connections take a firm positive grip on the resistor ribbon and are adjustable at will.

THERE is not a single piece of cast-iron in the Monitor Edgewound Resistor. It is practically unbreakable. The resistance is the same whether hot or cold and there is no tendency towards localized heating (hot spots).

Stop resistor breakages and burnouts by replacing grid banks with Monitor Units—enthusiastically endorsed by every user. They fit the space required by cast-iron grid resistors—can be made more compact if desired.

The greater reliability and reduced maintenance that accompanies the use of Monitor Edgewound Railway Resistors warrants your thorough investigation. Ask for detailed information.





At right — 3600-watt cast-iron grid railway resistor with two intermediate taps, mounting removed. Total weight of parts shown 72 lb. Count the number of joints.

At left—3600-watt Monitor Edgewound Railway Resistor with two intermediate taps, mounting removed. Total weight of parts shown 22 lb. Weight with mountings 35 lb. Count the number of joints.

Monitor Controller Company, Gay, Lombard and Frederick Streets, Baltimore, Md.

New York Chicago Buffalo Cincinnati Detroit Pittsburgh Philadelphia St. Louis Birmingham New Orleans Cleveland Boston Washington Los Angeles San Francisco

Monitor Edgewound Resistor

6223-1

Cost Reduction

SUCCESSFUL operation of a modern industrial plant is becoming more and more a question of costs. Time study, routing, labor and time-saving machinery, "hand-to-mouth" buying and various other expedients are shaving costs to the last fraction of a cent. Every industrial concern has been forced into the race for greater economy and lower cost production.

In the effort to reduce costs, efficiency engineers sometimes overlook the important item of lubrication. Yet no single item has a more far-reaching effect on the ultimate cost of the product of the plant.

Depreciation of machinery, repair cost, replacement expense—all these must be added to the final cost of the product of the plant. And all these items can be reduced to the minimum by the use of high quality oils and greases of grades suited to the machinery.

Standard Oils and Greases

are lubricants of the highest quality, and are made in grades suited to the requirements of all industrial machinery in use today. By reducing friction to the minimum, they will cut down depreciation repair and replacement costs.

The Standard Oil Company (Indiana) representative in your locality is thoroughly familiar with the lubrication requirements of modern machinery, and will recommend the correct grades for your use.

STANDARD OIL COMPANY
(INDIANA)
910 South Michigan Avenue Chicago, Illinois

10
outstanding advantages

As compared to shellac-pasted mica, Super-Micanite has the following characteristics:

ELECTRICAL

1 Dielectric strength—10% to 60% greater.
2 Volume Resistivity — 100% greater.
3 Surface Resistivity — 300% greater.
4 Dielectric Power Loss—34% less.

PHYSICAL

5 Slippage—shows practically none under pressure.
6 Transverse, strength — 50% to 100% greater.
7 Density—7% greater.

CHEMICAL

8 Carbonization—Its binder shows only *slight* tendency to carbonize under high temperatures and when exposed to arcing.
9 Corrosion—Is non-corrosive to copper. Its binder decomposes at a *higher* temperature and the decomposition products, formed below the carbonization point, are *neither corrosive nor conductive.*
10 Effect of heat—slight.

Super-Micanite

Pat. Aug. 25, 1914; June 14, 1926

A New and Important Contribution to the Art of Electrical Insulation

Look over its ten advantages listed. Super-Micanite is truly a super insulation.

It means better, more dependable motors, fewer breakdowns, reduced maintenance.

Let us send you all the interesting facts about this unique insulation, its uses, application and advantages. A post card request will promptly bring you a copy of the Super-Micanite Bulletin.

MICA INSULATOR COMPANY
World's Largest Manufacturers of Mica Insulation
Established 1893
New York: 68 Church St. Chicago: 542 So. Dearborn St.
Cleveland Pittsburgh Cincinnati San Francisco Los Angeles
Seattle
Works Schenectady, N.Y.; London, England; Victoriaville, Canada

PERFECT
MICANITE
INSULATOR
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Electrical
INSULATION

PERFECT
EMPIRE
INSULATOR
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MICA INSULATION OILED CLOTH INSULATION

The Springs they buy again

Only springs of dependable quality are bought by railway men over and over again. The fact that for more than 20 years leading railway properties have repeated continuously on "Fort Pitt" Springs, is all the *proof of reliable service* any reasonable man wants.

Order "Fort Pitt" Springs for your modern, quiet, comfortable-riding cars.

Consider some of these—

Full Elliptics for Car Trucks;
Half Elliptics for Locomotive and Cars;
Special Types of Quarter, Half and Three-Quarter Elliptics for Electric Railway Service;
Drawbar Springs, Equalizer Springs, Extension Springs.

Prompt shipments can be made. Write for Catalog and Specification Book.

Fort Pitt Spring & Manufacturing Co.
Pittsburgh, Pa.

FORT PITT

ALUMINUM

CAR STRUCTURE

The use of high-strength aluminum has in some cases reduced first-cost and has always reduced weight. One pound of aluminum shows a saving of two pounds over heavier metals. The modern car is a light car . . . . aluminum saves weight!

High-strength aluminum alloys are furnished in sheet, sand- and die-castings, permanent-mold castings, tubing, rivets, mouldings, etc.

A. C. S. R.

As Catenary Messenger

Aluminum cable, with a core of stranded high strength steel wires, combine the functions of Messenger and Feeder most economically, for it is non-corrodible, and at the same time has the mechanical advantages of high grade steel. The minimums of supported weight and resulting stresses are obtained by the use of aluminum conductors and fittings.

CONDUIT

Its weight is about 1-3 that of ordinary metal conduit. The 1 in. size weighs only .6 lbs. per ft.; the ½ in. size only .3 lbs.

100 lbs. of aluminum conduit saves 200 lbs. of weight by displacing 300 lbs. of ordinary metal conduit.

Also aluminum is unusually resistant to common corrosive agents. No paint ever needed . . . . easier to install . . . . and only 1-3 the weight!

Booklets sent on request cover Strong Alloys, Conduit, Paint Casting Alloys, etc. Please mention the field in which you are interested.

ALUMINUM COMPANY OF AMERICA
OLIVER BUILDING, PITTSBURGH, PENNA.
Makers of Aluminum in Every Commercial Form

SILVER LAKE TROLLEY CORD

would be "plotted" by statisticians in terms of "miles of cord in service"—miles and miles of Silver Lake Trolley Cord and Silver Lake Bell and Signal Cord that have established an enviable record during more than half a century, because of their excellent service, their tough, strong, waterproof, *non-stretching* and long lasting qualities.

Bell and Register Cords made in all sizes and colors.

Send for Catalogs and Samples.

SILVER LAKE COMPANY, Newtonville, Mass.

Write your own!

The savings shown are of the Georgia Railway & Power Company from ties and timbers creosoted by their own organization and from creosoted southern yellow pine poles most of which have been furnished by this company. These figures may not be correct for your conditions, but they will suggest the approximate savings that you could secure by the adoption of AmCreCo creosoted timber. Fill in your own figures and study the results.

	Fill in your own figures in this column		Actual unit savings per year on one road		Approximate savings per year on your road
Total miles of open track	....	×	$290.40	=	....
Total miles of track under pavement costing $1.00 per sq. yd.	....	×	528.00	=	....
Total miles of track under pavement costing $3.50 per sq. yd.	....	×	1188.00	=	....
Total bridge timber (in thousand board feet)	....	×	1.72	=	....
Total miles of pole lines	....	×	281.98	=	....
Grand Total Annual Saving					....

For information or quotations on creosoted timber, address

AMERICAN CREOSOTING COMPANY
INCORPORATED

COLONIAL CREOSOTING COMPANY
INCORPORATED

AMCRECO
LOWRY PROCESS
CREOSOTED WOOD

GEORGIA CREOSOTING COMPANY
INCORPORATED

LOUISVILLE ~ KENTUCKY

SALES OFFICES

350 Madison Ave., New York City. 401 W. Main St., Louisville, Ky.
Bogalusa, La. 332 So. Michigan Ave., Chicago Brunswick, Ga.

AmCreCo creosoted southern yellow pine poles on a Georgia Railway & Power Company ine.

E.R.J.1-

INVESTIGATE!

this New

The New OHMER Ticket Printing Register *for*

Electric Railways,
Steam Railways,
Motor Coaches, Ferries,
Excursion Boats,
Steamships, Toll Bridges,
Ticket Offices.

—*Wherever Fare Protection Is Needed.*

Ticket-Printing Fare-Protecting Register!

IT IS the most revolutionary development in the history of passenger transportation for eliminating losses in ticket selling and fare collecting. It stops the hidden leaks, detects inefficiency and carelessness, removes temptation. It positively enforces an accurate accounting of every penny received for every passenger carried.

Printed, Unchangeable Records

It provides a locked-in, secret, untamperable record of every detail of every fare transaction—a record that shows the amount of fare paid, the station or zone from and to which the passenger is carried, the direction traveled, the class of ticket sold, the date, the consecutive number of the transaction, and the conductor or operator in charge. This record is instantly and automatically made at the moment the transaction takes place and corresponds to the information appearing on the ticket which the register prints and issues.

With such a record both on the ticket and also locked up inside the register, you have unsurpassed protection against losses of all kinds in ticket selling and fare collecting.

27 Years' Experience Behind It

This new Ohmer Ticket-Printing Register is the development of 27 years of experience in making nothing but precision recording and printing devices for transportation companies. It is light and compact, exceedingly simple and easy to operate, will give years of trouble-free service, and pays for itself over and over again by the money it saves.

Let us tell you more about it. A full description will be sent you on request. Or, if you prefer, we will have one of our representatives call and explain it to you personally. This will not obligate you in any way. Write or wire today.

OHMER
REG. U.S. PAT. OFF.
Transportation Recording Devices

OHMER FARE REGISTER COMPANY
Dept. Y, DAYTON, OHIO, U. S. A.

15,500

passengers carried in one year!

Statistics prepared by the American Electric Railway Association (Bulletin No. 104) disclose that 15,500,000,000 passengers were accounted for by the electric railways in 1925. This, however, is the total number of passengers whose fares found their way to the treasuries of the companies. How many riders whose fares did not find their way to the treasury could be added to this amount? The number, if known, might prove astonishing. Many railways still consider the fare collection method of importance only from the viewpoint of office routine. It is really the most important detail of the business!

In preparing this year's budget consider your fare collection problem seriously. It is the

GLOBE

000,000

backbone of your business, the channel through which each passenger contributes his fare to the company treasury. Make sure it gets there!

Being makers of tickets and checks since 1873, our experience and modern plant qualify us to render electric railways a real service in fare collection matters. Globe leadership in experience, accuracy, quality workmanship and prompt service has never been challenged.

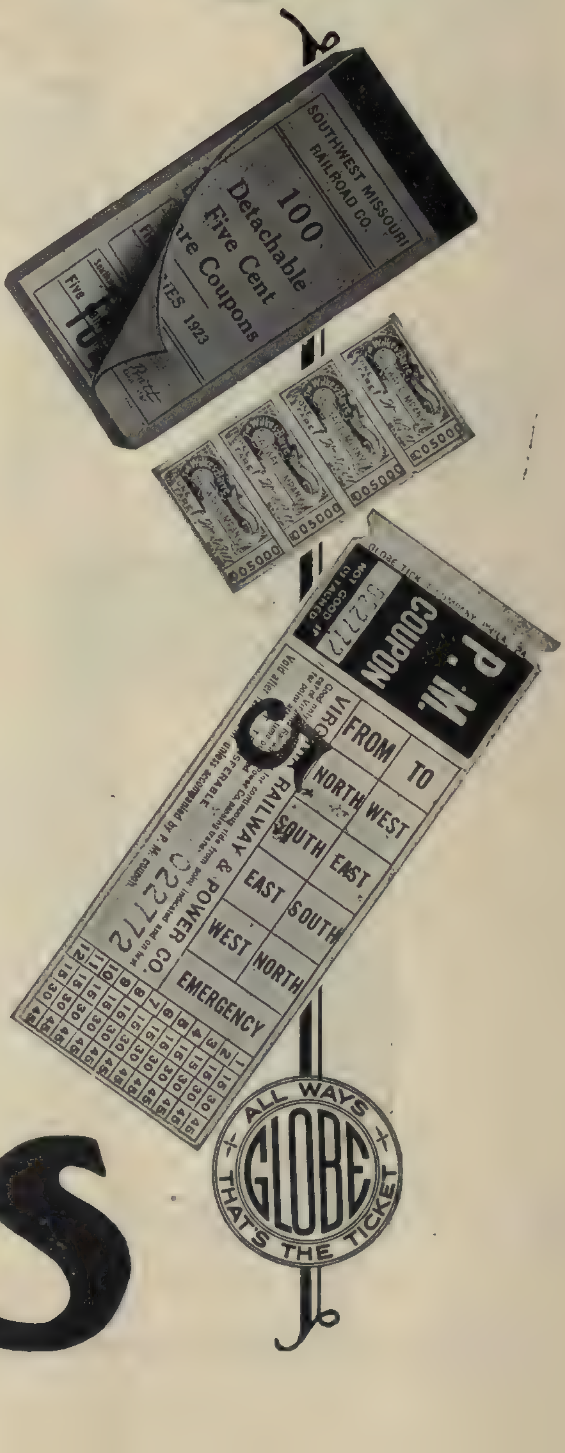
Whether it be trip tickets, or in rolls, strips or books, cash fare receipts, weekly pass, monthly commutation cards, or books, transfers, identification checks, hat checks, baggage checks, or any other requirement, consult our experts and procure our prices.

GLOBE TICKET COMPANY

makers of tickets and checks since 1873.

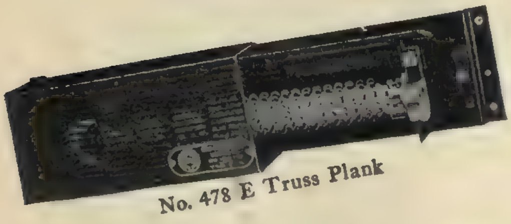
116 N. 12th St., Philadelphia, Pa.

Los Angeles New York San Francisco

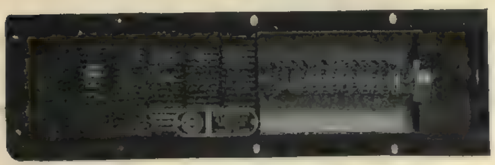

SOUTHWEST MISSOURI RAILROAD CO.
100 Detachable Five Cent Fare Coupons
1923
05000
P.M. COUPON
VIRGINIA RAILWAY & POWER CO.
FROM
TO
NORTH
WEST
SOUTH
EAST
EMERGENCY
022772
ALL WAYS
GLOBE
THAT'S THE TICKET

CKETS

Proper Car Temperatures Improve Public Relations!



No. 478 E Truss Plank



No. 414 E Panel

No. 470 E Vestibule

Particularly at this time of the year you know the demoralizing effect which improper car temperatures have on the riding public! Are your passengers continually complaining about your car temperatures? Too hot? Too cold? Do such complaints improve your relations with the riding public?

There is no necessity for permitting such complaints to continue. Equip your cars with

Gold Electric Car Heaters *and* Gold Thermostatic Control

They will assure your cars having the proper temperature at all times. They will assure a comfortable ride for your passengers. They will minimize the possibility of temperature complaints and they will improve your public relations.

With small initial expense and negligible maintenance costs, Gold Electric Heaters and Thermostatic Control are real economy. For example, one company had in service 12,000 Gold Electric Heaters. Over a period of more than eleven years they spent only $200 for repair parts—all parts being bought direct from us.

Equip your cars with Gold Electric Car Heaters and convince yourself of the economies that can be effected in heater operation; and the complete satisfaction accorded your passengers.

ENCLOSED HEATING ELEMENTS SUPPLIED IF DESIRED

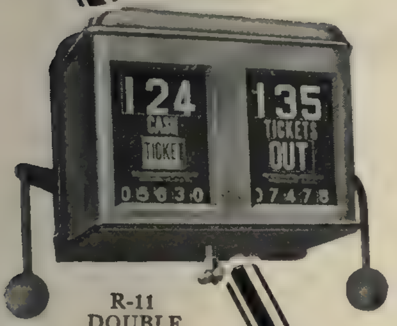
Gold Car Heating & Lighting Co.
Bush Terminal
220 36th Street, Brooklyn, N. Y.

ELECTRIC FARE REGISTRATION

The trend in the design of modern Cars tends strongly toward greater operating efficiency, and greater comfort and safety for the passenger.

Why not carry this idea to its logical conclusion? Protect your revenue by installing International Electrically Operated Fare Registers! Electric operation is reliable, fast, and simple, assuring accurate registration of all fares and transfers with the least expenditure of effort on the part of the trainman.

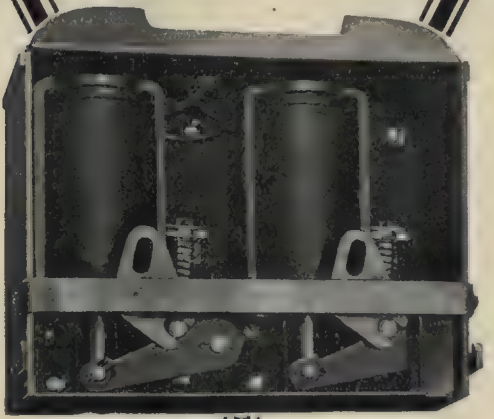
We also manufacture a full line of International single and double fare registers equipped for mechanical and hand or foot operation.



R-11
DOUBLE

R-10
SINGLE

The electric back of the double register is equipped with two solenoids; one for the operation of the cash fare side and the other for the operation of the transfer side. Both solenoids are wound for operation on 350-650 volts D.C. The register operating circuit is not broken in the register back.



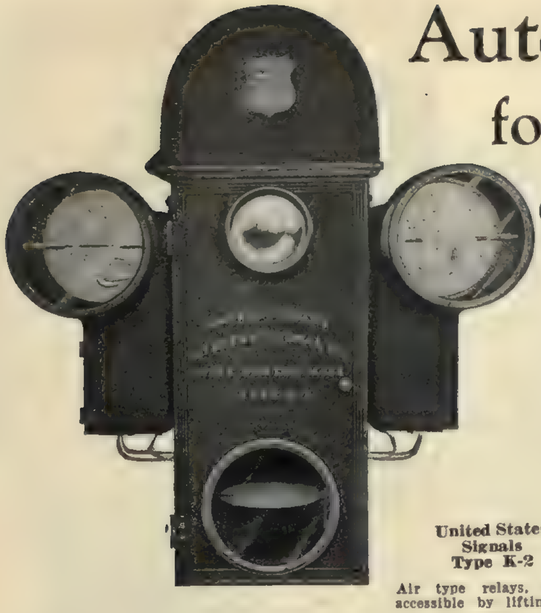
ELECTRIC BACK
FOR DOUBLE REGISTER

The electrically operated registers, both single and double, are operated by a specially designed foot switch mounted on the floor.

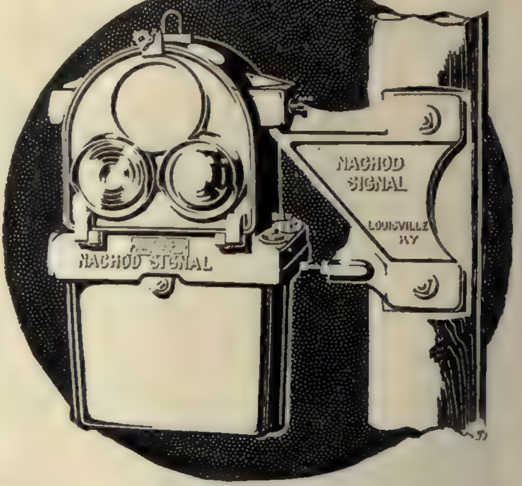
The International Register Company

15 South Throop St., Chicago

Automatic Block Signals for *all* conditions



United States Signals Type K-2
Air type relays, easily accessible by lifting the cover.



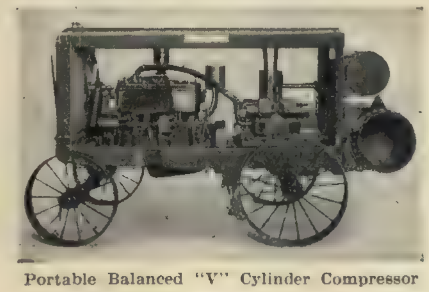
Nachod Signal Type CD
Compact indications, oil-immersed relays.

THESE Signals are car-counting and operate thru two line wires. They enable you to get the most out of your single track by speeding up the service, and saving time at switches. On a signaled route your cars can get over the line to meet competition, and bring in the revenue. Besides Block Signals of all kinds, we make Highway Crossing Signals, Headway Recorders, Flasher Relays. Write for Catalog.

NACHOD SPELLS SAFETY

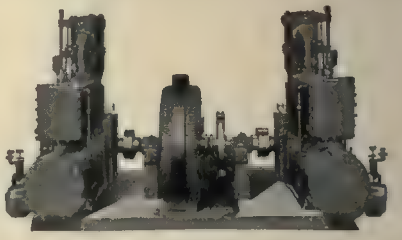
NACHOD & UNITED STATES SIGNAL CO., Inc., 4777 Louisville Avenue, Louisville, Ky.

English Representative—Forest City Electric Co., Ltd., Manchester, Eng.



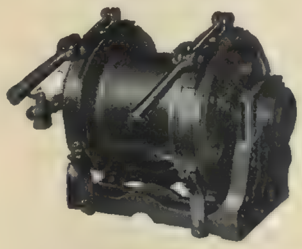
Portable Balanced "V" Cylinder Compressor

Single Stage Belted Compressor



Twin Angle Compound Compressor

Heavy Concrete Breaker



"Turbinair" Hoist

Lower Shop and Maintenance Costs in 1927

1927 will mark reduced shop and maintenance costs for many electric railroads—through the use of Sullivan equipment. Have you the latest Sullivan Catalogs on air compressors, hoists, and concrete breakers?

Angle Compound Compressors save installation cost, foundations and floor space—and save power, due to multi-step load control. Positive, automatic lubrication, and "Wafer" valves, are other features. Capacities range from 400 to 3700 ft. per minute. Catalog 3283-A.

If your air power requirements are between 68 and 500 ft. you will save money with the "WG-6" compressor. "Wafer" valves, inlet valve unloader, positive automatic lubrication, and total enclosure of working parts are some advantages of the "WG-6". Catalog 3283-B.

Portable Air power for maintenance work is cheap when supplied by Sullivan Portable Compressors. Operation is by electric motor or Buda engine. Mountings are steel wheels, rubber-tired trailers, or skids. Catalog 3283-D.

Sullivan Portable electric and air hoists and Sullivan concrete breakers are other machines, for cutting maintenance costs. Catalogs 3276-F, 3276-G, 3281-I.

Write for the Catalogs.

SULLIVAN
TRADE MARK
MACHINERY COMPANY
150 So. Michigan Ave., Chicago

"Canned Experience"

Make use of the other man's experience

That old saying

about experience being the best teacher is absolutely sound in one sense. But most of us recite it without thinking that experience may be of various sorts—the experience of other men as well as our own, "canned experience," if you please, ready for use. Just open and serve yourself! Why not take advantage of the experience of other men as far as we can and save not only years of time but many expensive lessons?

Do you know how much of the world's best research in the electric railway field is contained in

McGRAW-HILL BOOKS

That single fact or table may be worth many times the price of the book to you.

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of these McGraw-Hill Books that you would like to see—one, or two or a half dozen—as many as you wish. Read them for ten days free—keep those you want—send back those you don't want.

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1

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New Second Edition, 798 *pages, flexible, pocket size,* 600 *illustrations,* $4.00 *net, postpaid.*

The New Richey is virtually an encyclopedia on modern electric railway organization, administration and operation. It is the one great pocketbook of practice data, formulas and tables in the electric railway field. The new second edition covers the latest developments—describes new methods—records changes in theory and practice.

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5

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6

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This book presents the essential facts and the most mature views upon the underlying financial and economic phases of public utility companies with particular emphasis on electric railways, electric light and power companies and gas companies

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The Handbook saves time, trouble, worry, bother—and money. The tables, formulas, descriptions of methods and equipment, explanations of principles, and other electrical engineering data are used day in and day out—it means something to have them in convenient form easy to get at quickly.

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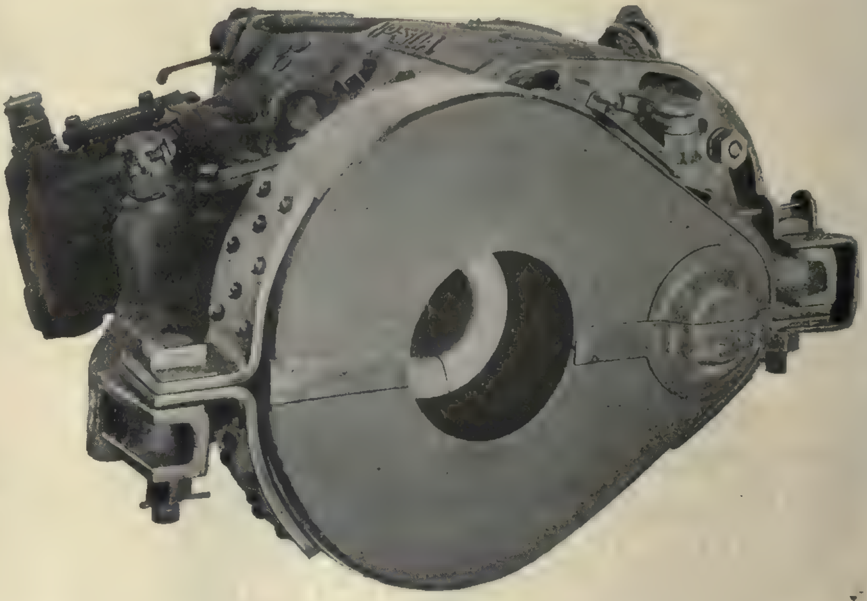
THE CONSOLIDATED CAR FENDER COMPANY
PROVIDENCE, R. I.

Wendell & MacDuffie Co., General Sales Agents
110 East 42nd St., New York, N. Y.

For lightness—strength—low maintenance



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FOR W. H. 510
MOTOR

CHILLINGWORTH ONE-PIECE GEAR CASE

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Motor Protection

Misfit brushes are a constant source of trouble and expense. Protect the operating efficiency and life of your motors with brushes of the correct material, shape and size. U. S. G. Brushes are built to meet your requirements exactly.

Write for the new Brush Catalog. Just off the press

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Saginaw, Michigan
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Motor and Generator BRUSHES

Nick Lynt Says:

"Bring Intricate Ventilation Problems to us"

"It makes very little difference *what* kind of a ventilation problem it is—we have the means to solve it. Years of research—accumulated data—have brought us a mastery of ventilation of moving vehicles.

"Only last month, a manufacturer put up to us the problem of cooling a certain part of the mechanism of a bus, which had been overheating. We are on the road to solution now.

"The Ventiduct, and the Compensating duct solve two other problems—that of cooling the air around the driver's seat and cooling the air under the hood.

"And soon, we'll be able to announce something in a combination of heater and ventilator which will write a new chapter in those phases of bus development—wait until you see it."

N-L Dual Ventilator
(Patented)

Provides excellent ventilation—50% to 100% greater exhaust than any other roof ventilator—for good weather ranges. In down position it provides good ventilation for stormy weather. Perfect water baffle. Stamped of heavy auto body stock—will last.

The Nichols-Lintern Co.
7960 Lorain Ave., Cleveland, Ohio

Earll Catchers and Retrievers

essentially MODERN equipment

with five specific points of superiority in service

Modern cars need this modern protection. And the modern M.M. knows just what Earll features mean in time and trouble saved on catcher and retriever maintenance. Better let us send you all the details so that you can specify the right equipment on your next new car or replacement order.

First the No-Wear check pawl that always strikes full face on—never misses, never upsets or wears either the end of pawl or the teeth the pawl engages.

Then the Free-Winding Tension Spring that handles wet rope as easily as dry—for quick, positive action in any weather.

Then the Ratchet Wind to make retriever rewinding easy and safe.

Then an Emergency Release that permits of the trolley being run up instantly when necessary.

And finally a perfect automatic oiling system,—lubricating every part with one "shot" in one hole once in three months.

"Catch trouble before it starts.
Retrieve profits before they're lost."

C. I. EARLL, York, Pa.

Canadian Agents:
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Strombos Signals for Railway Service

Most powerful of all signals!

A pleasing sound of tremendous volume is emitted from the powerful Strombos Signal. It penetrates all noises and is audible at great distances. They are admirably suited for electric railway service. Whenever required it broadcasts a warning of approaching danger and promotes safe railway operation.

The *"Strombos"* uses only one-tenth the volume of air required by a whistle. It operates on a pressure of ten pounds or more and is controlled by lever valve and cord. They are furnished with an interchangeable base, for vertical or flat surfaces.

The *"Strombos"* has no moving parts to get out of order or fail in the emergency.

Write for more complete data and quotations.

AMERICAN STROMBOS CO.
INCORPORATED
18th & Market Sts., Philadelphia, Pa.

Ramapo Automatic Return Switch Stands

designed primarily to minimize possibility of accident at passing sidings where it is desired that switch after being run through shall be returned automatically to original position. Powerful springs, a part of base fixture, allow cars to pass through switch returning the points tightly to original setting. The springs do not intervene between hand lever, spindle and switch points so hand lever is positive. A conspicuous target, rigidly connected to switch points, always indicates position of switch points, either opened or closed, and reveals danger if points are held partially open by an obstruction.

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Frogs
Crossings
Tee Rail
Construction

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TRADE MARK

CHAR BHI

Certain Thibetans are polyandrous—three or four (char bhi) men having the one wife.

You'll admit that at first blush you see *big* economy in it.

There sure is.

And that's a big drawing card in these days of rising costs.

But the overshadowing problem is how to keep sweet serenity in the home—for some men have more dominating characteristics than others, and vice versa.

Any Morganite brush user can tell you that before he became experienced he tried to save money by using the same grade brush on three or four different types of service.

And what he bought for his economy was a business life like the home life of a timid Thibetan.

Morganite
Brush Co., Inc.

Main Office and Factory
519 West 39th St., New York

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Cincinnati, Electrical Engineering & Mfg. Co., 607 Mercantile Library Building.
Cleveland, Electrical Engineering & Mfg. Co., 422 Union Building.
Baltimore, O. T. Hall, Sales Engineer, 437-A Equitable Building.
Revere, Mass., J. F. Drummey, 75 Pleasant Street.
Los Angeles, Special Service Sales Co., 502 Delta Building.
San Francisco, Special Service Sales Co., 222 Underwood Building, 545 Market Street.
Toronto, Can., Railway & Power Engineering Corp., Ltd., 101 Eastern Ave.
Montreal Can., Railway & Power Engineering Corp., Ltd., 326 Craig St. West.
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Where performance counts

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They talk for themselves

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Hand-Holds—

are a necessity! Without them great difficulty is experienced by passengers attempting to walk through cars. They create better public relations!

They will not stain the hands, and the riding public, which shuns anything soiled, is pleased with this feature. This also helps to improve good will!

And they are moderately priced. *Investigate.*

CENTRAL EQUIPMENT COMPANY
800 Englewood Ave., Buffalo, N. Y.

"American"

Light
and
Heavy
SPRINGS

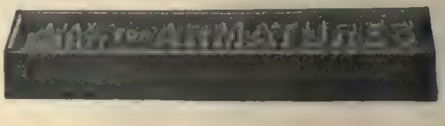
Advantageous location for prompt delivery of raw materials—Ample equipment of modern automatic machinery and appliances — Pyrometer equipped furnaces assuring accurate, uniform heat treatment and over 35 years' spring manufacturing experience constitute a service which means satisfaction.

May we estimate on your needs?

AMERICAN SPIRAL SPRING & MFG. CO.
Established 1887
ARSENAL STATION
PITTSBURGH, PA.,
U. S. A.

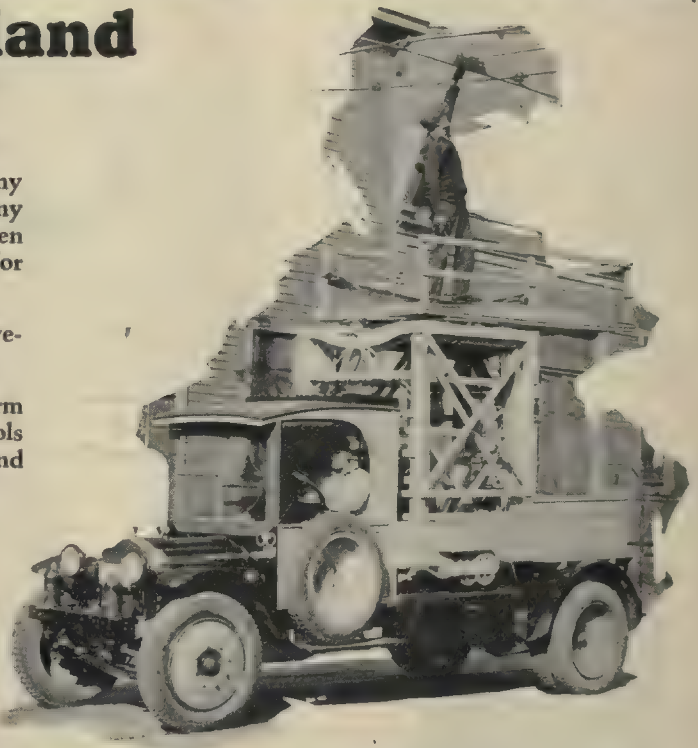
Cold Dinners
for *your* passengers?

Not if you use
AJAX
BABBITT *for* ARMATURES
keeps the rolling stock rolling



The Ajax Metal Company
Established 1880
PHILADELPHIA
NEW YORK CHICAGO BOSTON CLEVELAND

One of a fleet of Trenton Tower Outfits used by the Cleveland Railway Co.



For construction, maintenance and inspection of their many miles of overhead system the Cleveland Railway Company uses a whole fleet of Trenton Tower Outfits — fourteen trucks, one line car and several tower outfits in stock for replacement.

These Outfits have been standard equipment on the Cleveland Railway property for a number of years.

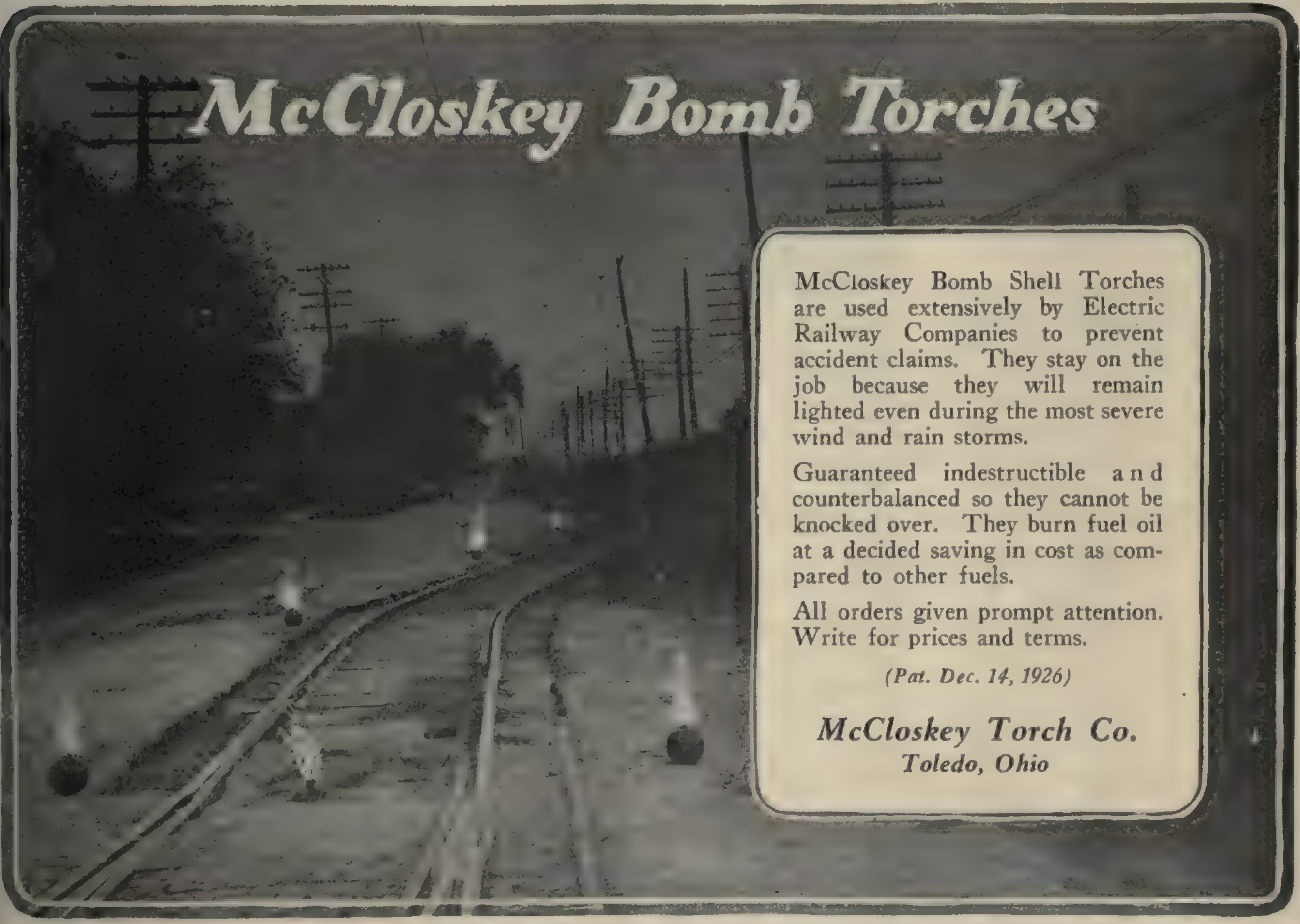
The three, sturdy well-designed sections afford a firm footing for workman even when fully extended. Controls located at the driver's seat allow for easy hoisting and lowering of the sections.

Write us today for further details of construction, quotations on your requirements and performance, facts and figures on other electric railways.

J. R. McCARDELL CO.

Trenton, New Jersey, U. S. A.

TRENTON TOWER OUTFITS



McCloskey Bomb Torches

McCloskey Bomb Shell Torches are used extensively by Electric Railway Companies to prevent accident claims. They stay on the job because they will remain lighted even during the most severe wind and rain storms.

Guaranteed indestructible and counterbalanced so they cannot be knocked over. They burn fuel oil at a decided saving in cost as compared to other fuels.

All orders given prompt attention. Write for prices and terms.

(Pat. Dec. 14, 1926)

McCloskey Torch Co.

Toledo, Ohio

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of Water Tube Boilers of continuing reliability

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Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

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SALT LAKE CITY, 405-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building

AIMCo
REG. U.S. PAT. OFF.

Electric Railway Automatic Signals

for Accessibility and Reliability

EST. 1855 AIMCo INC. 1916
"American" INSULATING MACHINERY COMPANY
REG. U.S. PAT. OFF.

521 Huntingdon St., Philadelphia, Pa.

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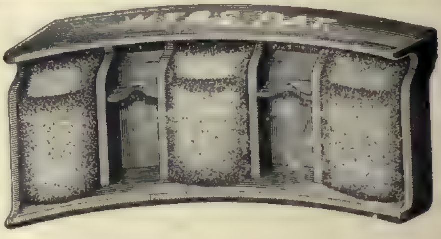

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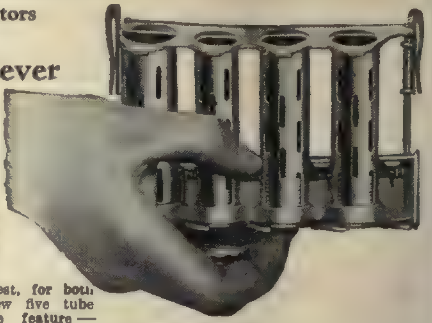

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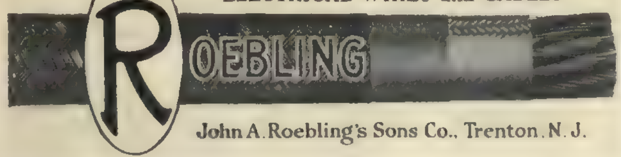

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Columbia Machine Works
General Electric Co.
Westinghouse E. & M. Co.

Controllers, Automatic, Electric
Monitor Controller Co.

Controllers, Electric
Monitor Controller Co.

Controllers, Motor
Monitor Controller Co.

Controller Regulators
Elec. Service Supplies Co.
Monitor Controller Co.

Controllers, Rheostatic
Monitor Controller Co.

Controllers, Speed
onitor Controllers Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.

Conveying & Hoisting Machinery
American Bridge Co.

Copper Wire
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.
Rome Wire Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co., The
American Steel & Wire Co.
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register, etc.
American Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
Samson Cordage Works
Silver Lake Co.

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
St Louis Car Co.
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.

Crane Controller, Electric
Monitor Controller Co.

Cranes, Electric, Industrial Truck Mounted
Baker-Raulang Co.

Cranes, Hoists & Lifts
Buda Co., The
Electric Service Supplies Co.

Cross Arms (See Brackets)

Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossing Foundations
International Steel Tie Co.

Crossings, Frog and Switch
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossing Signals, (See Signal Systems, Highway Crossing)

Crossings, Track (See Track, Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
O. M. Edwards Co., Inc.
Pantasote Co., Inc.
St. Louis Car Co.

Dealer's Machinery & Second Hand Equipment
Elec. Equipment Co.
Van Loan Corp., Irving S.

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Columbia Machine Works
Elec. Service Supplies Co.

Detective Service
Wish Service, Edward P.

Door Operating Devices
Brill Co., The J. G.
Consolidated Car Heat. Co.
National Pneumatic Co.
Safety Car Devices Co.

Doors & Door Fixtures
Brill Co., The J. G.
O. M. Edwards Co., Inc.
General Electric Co.
Hale-Kilburn Co.
St. Louis Car Co.

Doors, Folding Vestibule
National Pneumatic Co.
Safety Car Devices Co.

Drills, Rock
Sullivan Machinery Co.

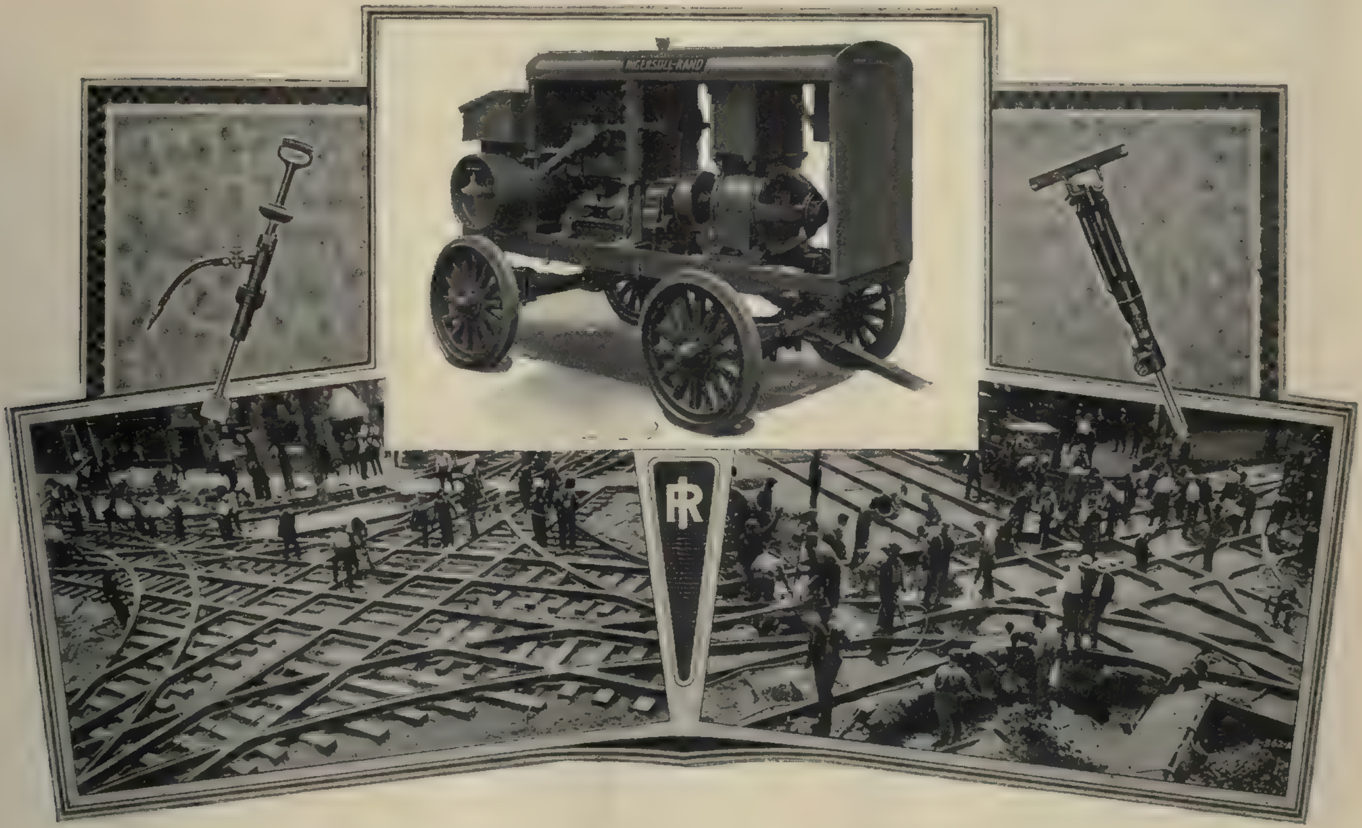
Drills, Track
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ingersoll-Rand Co.
Ohio Brass Co.

Dryers, Sand
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Ears
Columbia Machine Works
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E & M. Co.

(Continued on page 156)

Pneumatic Tie Tampers and Paving Breakers



Two very effective means of reducing track work costs

Ingersoll-Rand Pneumatic Tie Tampers tamp track at less than half the cost of doing the job by hand methods. It has been definitely proved on dozens of roads that four men with pneumatic tampers will tamp more track, and do a better job, than 12 to 16 men using hand methods.

I-R Pneumatic "Paving Breakers" save from 60% to 75% of the time and labor taken by hand methods in tearing up pavement or breaking out heavy concrete foundations.

Every road should include Tie Tampers and Paving Breakers in its equipment in order to take advantage of these savings on track work.

Ask for full details as to the savings made by these tools on other jobs.

INGERSOLL-RAND COMPANY-11 BROADWAY, NEW YORK CITY.
Offices in principal cities the world over
FOR CANADA REFER-CANADIAN INGERSOLL-RAND CO. LIMITED, 260 ST. JAMES STREET, MONTREAL, QUEBEC.

220 T.T.

Ingersoll-Rand

Electric Grinders
Railway Track-work Co.

Electric Transmission Towers
American Bridge Co.

Electrical Wires and Cables
Amer. Electrical Works
Amer. Steel & Wire Co.
John A. Roebling's Sons Co.
Rome Wire Co.

Electrodes, Carbon
Railway Track-work Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Track-work Co.
Una Welding & Bonding Co

Engineers, Consulting, Contracting and Operating
Archbold-Brady Co.
Beeler, John A.
J. Rowland Bibbins
F. J. Brennan
Buchanan & Layng Corp.
A. B. Cole
Day & Zimmermann, Inc.
A. L. Drum & Co.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
Kelly-Cooke Co.
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster
White Eng. Corp., The J. G.

Engines, Gas, Oil and Steam
Ingersoll-Rand Co.
Westinghouse E. & M. Co.

Engines, Gasoline
Continental Motors Co.
Waukesha Motor Co.

Exterior Side Panels
Haskelite Mfg. Corp.

Fare Boxes
Cleveland Fare Box Co.
Economy Electric Devices Co.
J. L. Galef Co.
Johnson Fare Box Co.
Nat'l Ry. Appliance Co.
Ohmer Fare Register Co.
Perey Mfg. Co.

Fare Registers
Elec. Service Supplies Co.
Ohmer Fare Register Co.

Fences, Woven Wire and Fence Posts
Acme Wire Co., The
Amer. Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Fender Co.
Root Spring Scraper Co.
St. Louis Car Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Coils (See Coils)

Flaxlinum Insulators
National Railway Appliance Co.

Floodlights
Elec. Service Supplies Co.

Floor, Sub
Haskelite Mfg. Corp.

Flooring, Fireproof
Irving Iron Works

Flooring, Non-Slipping
Irving Iron Works

Flooring, Open Steel
Irving Iron Works

Flooring, Steel, Subway
Irving Iron Works

Flooring, Ventilating
Irving Iron Works

Floors
Haskelite Mfg. Corp.

Forgings
Brill Co., The J. G.
Duff Mfg. Co.
Standard Steel Works Co.

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Frogs, Track (See Track Work)

Frogs, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Furnaces, Electric
American Brown Boveri Corp.

Furnaces, Electric, Steel Melting
American Bridge Co.

Fuses and Fuse Boxes
Columbia Machine Works
Consolidated Car Heat. Co.
General Electric Co.
Westinghouse E. & M. Co.

Fuses, Refillable
General Electric Co.

Gaskets
Westinghouse Tr. Br. Co.

Gasoline Torches
Economy Electric Devices Co.

Gas Producers
Westinghouse E. & M. Co.

Gates, Car
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Gauges, Oil and Water
Ohio Brass Co.

Gear Blanks
Brill Co., The J. G.
Standard Steel Works Co.

Gear Cases
Chillingworth Mfg. Co.
Columbia Machine Works
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Gears and Pinions
Bemis Car Truck Co.
Columbia Machine Works
Elec. Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

Generating Sets, Gas-Electric
General Electric Co.

Generators
American Brown Boveri Corp.
General Electric Co.
Leece-Neville Co.
Westinghouse k. & M. Co.

Girder Rails
Bethlehem Steel Co
Lorain Steel Co.

Gongs (See Bells and Gongs)

Grating, Steel, Subway
Irving Iron Works

Greases (See Lubricants)

Grinders & Grinding Supplies
Metal & Thermit Corp.
Railway Track-work Co.

Grinders, Portable
Railway Track-work Co.

Grinders, Portable Electric
Railway Track-work Co.

Grinding Bricks and Wheels
Railway Track-work Co.

Guard Rail Clamps
Ramapo Ajax Corp.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Guards, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.

Hammers, Pneumatic
Ingersoll-Rand Co.

Hand Holds
Central Equipment Co.

Harps, Trolley
Columbia Machine Works
Elec. Service Supplies Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.
Star Brass Works

Headlights
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Headlining
Columbia Machine Works
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Heaters, Car (Electric)
Consolidated Car Heat. Co.
Economy Electric Devices Co.
Gold Car Heat. & Ltg. Co.
Nat'l Ry. Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car, Stove
Smith Heater Co., Peter

Helmets, Welding
Railway Track-work Co.
Una Welding & Bonding Co.

Hoists & Lifts
Columbia Machine Works
Ford Chain Block & M. Co.

Hoists, Portable
Ingersoll-Rand Co.
Sullivan Machinery Co.

Hose, Bridges
Ohio Brass Co

Hose, Pneumatic
Westinghouse Tr. Br. Co.

Ignition Units
Leece Neville Co.

Industrial Tractors
International Harvester Co.

Instruments, Measuring, Testing and Recording
American Steel & Wire Co.
Economy Electric Devices Co.
General Electric Co.
Roller-Smith Co.
Westinghouse E. & M. Co.

Insulating Cloth, Paper and Tape
General Electric Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Okonite Co.
Okonite-Callender Cable Co. Inc.
U. S. Rubber Co.
Westinghouse E. & M. Co.

Insulating Machinery
Amer. Ins. Machinery Co.

Insulating Silk
Irvington Varnish & Ins. Co.

Insulating Varnishes
Irvington Varnish and Insulating Co.

Insulation (See also Paints)
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Okonite Co.
Okonite-Callender Cable Co. Inc.
U. S. Rubber Co.
Westinghouse E. & M. Co.

Insulation Slot
Irvington Varnish & Ins. Co.

Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.

Insulators (See also Line Materials)
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Interior Side Linings
Haskelite Mfg. Corp.

Interurban Cars (See Cars, Passenger, Freight, Express, etc.)
Cummings Car & Coach Co.

Jacks (See also Hoists and Lifts)
Buda Co., The
Columbia Machine Works
Duff Mfg. Co.
Elec. Service Supplies Co.
National Ry. Appliance Co.

Journal Boxes
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.

Lamps, Guards and Fixtures
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Arc & Incandescent (See also Headlights)
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Signal and Marker
Elec. Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.

Lanterns, Classification
Nichols-Lintern Co.

Leather
Cleveland Tanning Co.

Letter Boards
Haskelite Mfg. Corp.

Lighting Systems
Leece-Neville Co.

Lightning Protection
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
Archbold-Brady Co.
Dossert & Co.
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
More-Jones Brass & Metal Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Locking Spring Boxes
Wm. Wharton, Jr. & Co.

Locomotives, Diesel, Electric
American Brown Boveri Corp.

Locomotives, Electric
American Brown Boveri Corp.
Cummings Car & Coach Co.
General Electric Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Locomotives, Oil Engine, Electric, Diesel
Ingersoll-Rand Co.

Lubricating Engineers
Standard Oil Co. of Indiana
Texas Company
Universal Lubricating Co.

Lubricants, Oil and Grease
Standard Oil Co. of Indiana
Texas Company
Universal Lubricating Co.

Lumber (See Poles, Ties, etc.)

Machinery, Insulating
American Insulating Machinery Co.

Manganese Parts
Bemis Car Truck Co.

Manganese Steel Guard Rails
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Manganese Steel, Special Track Work
Bethlehem Steel Co.
Wm. Wharton, Jr. & Co.

Manganese Steel Switches, Frogs & Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Meters
Roller-Smith Co.

Mica
Mica Insulator Co.

Motor and Generator Sets
General Electric Co.

Motor Buses (See Buses, Motor)

Motor Controllers, Electric
Monitor Controller Co.

Motor Generator Sets
American Brown Boveri Corp.

Motor, Leads
Dossert & Co.

Motor Starters
Monitor Controller Co.

Motorman's Seats
Brill Co., The J. G.
Elec. Service Supplies Co.
Heywood Wakefield Co.
St. Louis Car Co.
Wood Co., Chas. N.

Motors, Electric
General Electric Co.
Westinghouse E. & M. Co.

Nitrocellulose
Valentine & Co.

Nuts and Bolts
Bemis Car Truck Co.
Hubbard & Co.

Ohmmeters
Roller-Smith Co.

Oil Purifiers
De Laval Separator Co.

Oils (See Lubricants)

Oxygen
International Oxygen Co.

Packing
U. S. Rubber Co.
Westinghouse Tr. Brake Co.

Paints and Varnishes (Insulating)
Dixon Crucible Co., Joseph
Electric Service Supplies Co.
Irvington Varnish & Ins. Co.

Paints and Varnishes for Woodwork
National Ry. Appliance Co.
Valentine & Co.

Panels, Outside, Inside
Haskelite Mfg. Corp.

Pavement Breakers
Ingersoll-Rand Co.
Sullivan Machinery Co.

Paving Material
American Brake Shoe & Foundry Co.

Pickups, Trolley Wire
Elec. Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Elec. Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
Bemis Car Truck Co.
Ohio Brass Co.
Westinghouse Tr. Brake Co.

Pipe Fittings
Standard Steel Works Co.
Westinghouse Tr. Brake Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Elec. Service Sup. Co.
Nat'l Ry. Appliance Co.

Plywood, Roofs, Headlinings, Floors, Interior Panels, Bulkheads, Truss Planks
Haskelite Mfg. Corp.

Pneumatic Tools
Ingersoll-Rand Co.

Pole Line Hardware
Bethlehem Steel Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Pole Reinforcing
Hubbard & Co.

Poles and Ties Treated
American Creosoting Co.
Bell Lumber Co.
International Creosoting Co.

Poles, Metal Street
Bates Expanded Steel Truss Co.
Elec. Ry. Equipment Co.
Hubbard & Co.

Poles, Ties, Posts, Piling & Lumber
American Bridge Co.
Bell Lumber Co.
International Creosoting Co.
Naugle Pole & Tie Co.

Poles, Trolley
Bell Lumber Co.
Elec. Service Supplies Co.
Nuttall Co., R. D.

Poles, Tubular Steel
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.

Portable Grinders
Buda Co., The

Potheads
Okonite Co.
Okonite-Callender Cable Co. Inc.

Power Houses
American Bridge Co.

Power Saving Devices
Economy Electric Devices Co.
National Ry. Appliance Co.

Pressure Regulators
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Westinghouse Tr. Brake Co.

Pumps
A. S. Cameron Steam Pumps (Ingersoll-Rand Co.)
Ingersoll-Rand (A. S. Cameron Steam Pumps)

Pumps, Air Lift
Sullivan Machinery Co.

Pumps, Vacuum
A. S. Cameron Steam Pumps (Ingersoll-Rand Co.)
Ingersoll-Rand (A. S. Cameron Steam Pumps)
Sullivan Machinery Co.

Punches, Ticket
International Register Co.
Wood Co., Chas. N.

Rail Braces & Fastenings
Ramapo Ajax Corp.

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.
Illinois Steel Co.
Rail Joint Co., The

Rail Joints, Welded
Lorain Steel Co.
Metal & Thermit Corp.

Rail Welding
Metal & Thermit Corp.
Railway Track-work Co.
Una Welding & Bonding Co.

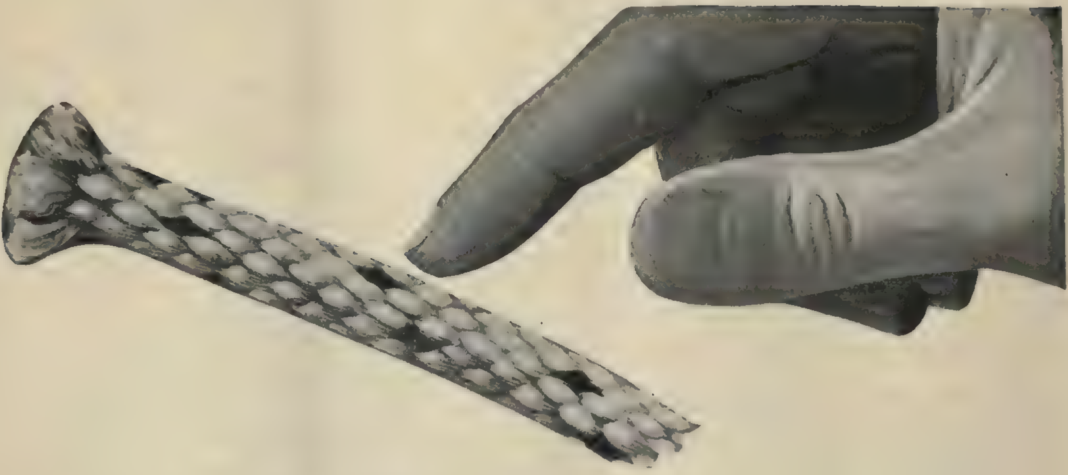
Rails, Relaying
L. B. Foster Co.

Rails, Steel
Carnegie Steel Co.
Electric Equipment Co.
L. B. Foster Co.
Illinois Steel Co.

Railway Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Railway Welding (See Welding Processes)

(Continuel on page 158)



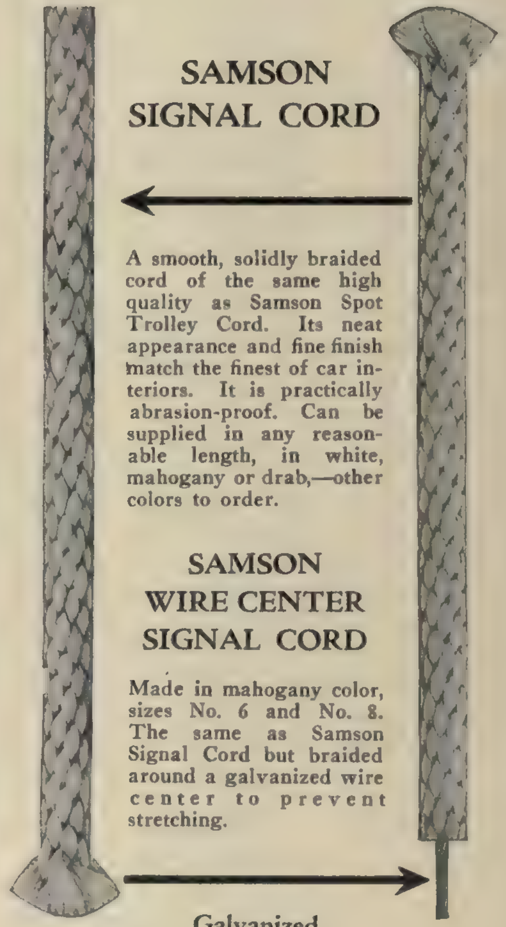
So easy to be SURE of good trolley cord

Just look for the colored spots, (in any color). They are our trade mark for Samson Spot Trolley Cord.

They tell you at a glance just what you're buying,—a cord made from the finest materials only, smoothly braided, uniform in thickness, and properly waterproofed by a special process. *It is always the same.*

Samson Spot Cord cannot swell or shrink,—"runs" easily in catchers and retrievers, rain or shine.

A piece of poor cord can cause a lot of trouble. Is it worth taking a chance when you can be SURE so easily?



SAMSON SIGNAL CORD

A smooth, solidly braided cord of the same high quality as Samson Spot Trolley Cord. Its neat appearance and fine finish match the finest of car interiors. It is practically abrasion-proof. Can be supplied in any reasonable length, in white, mahogany or drab,—other colors to order.

SAMSON WIRE CENTER SIGNAL CORD

Made in mahogany color, sizes No. 6 and No. 8. The same as Samson Signal Cord but braided around a galvanized wire center to prevent stretching.

Galvanized Wire Center

SAMSON CORDAGE WORKS

88 BROAD STREET BOSTON, MASS.

TRADE MARK

Rattan
Brill Co., The J. G.
Cummings Car & Coach Co.
Elec. Service Supplies Co.
Hale-Kilburn Co.
St. Louis Car Co.

Rattan Car Seat Webbing
Heywood-Wakefield Co.

Rectifiers, Mercury Arc Power
American Brown Boveri Corp.

Registers and Fittings
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
International Register Co.
Ohmer Fare Register Co.
St. Louis Car Co.

Regulators, Motor Speed
Monitor Controller Co.

Reinforcement, Concrete
Amer. Steel & Wire Co.
Bethlehem Steel Co.
Carnegie Steel Co.

Repair Shop Appliances (See also Coil Banding and Winding Machines)
Elec. Service Supplies Co.

Repair Work (See also Coils)
General Electric Co.
Westinghouse E. & M. Co.

Replacers, Car
Elec. Service Sup. Co.

Resistance, Wire and Tube
Driver-Harris Co.
General Electric Co.
Westinghouse E. & M. Co.

Resistances
Consolidated Car Heat. Co.

Retrievers, Trolley (See Catchers and Retrievers, Trolley)

Rheostats
General Electric Co.
Monitor Controller Co.
Westinghouse E. & M Co.

Roller Bearings
Hyatt Roller Bearing Co.

Roofing, Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Roofs, Car and Bus
Haskelite Mfg. Corp.

Rubber Specialties of all kinds
U. S. Rubber Co.

Safety Control Devices
Safety Car Devices Co.

Sanders, Track
Brill Co., The J. G.
Elec. Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.

Sash Fixtures, Car
Brill Co., The J. G.
O. M. Edwards Co., Inc.
St. Louis Car Co.

Sash Metal Car Window
Hale-Kilburn Co.
O. M. Edwards Co., Inc.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
Elec. Service Supplies Co.

Seating Materials
Brill Co., The J. G.
Haskelite Mfg. Corp.
Heywood-Wakefield Co.
Massachusetts Mohair Plush Co.
Pantasote Co., Inc., The
St. Louis Car Co.

Seats, Bus
Brill Co., The J. G.
Hale-Kilburn Co.
Heywood-Watefield Co.
St. Louis Car Co.

Seats, Car (See also Rattan)
Brill Co., The J. G.
Hale-Kilburn Co.
Heywood-Watefield Co.
St. Louis Car Co.

Second Hand Equipment
Electric Equipment Co.
Van Loan Corp., Irving S.

Shades, Vestibule
Brill Co., The J. G.

Shovels
Brill Co., The J. G.
Hubbard & Co.

Shovels, Power
Brill Co., The J. G.

Signals, Car Starting
Consolidated Car Heating Co.
Elec. Service Supplies Co.
National Pneumatic Co.

Signals, Indicating
Nichols-Lintern Co.

Signal Systems, Block
Elec. Service Supplies Co.
Nachod and U. S. Signal Co., Inc.
Union Switch & Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod and U. S. Signal Co., Inc.
Wood Co., Chas. N.

Signal Torches
McCloskey Torch Co.

Signals, Warning
American Strombos Co.

Slack Adjusters (See Brake Adjusters)

Sleet Wheels and Cutters
A. & J. M. Anderson Mfg. Co.
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
More-Jones Brass & Metal Co.

Smokestacks
Nichols-Lintern Co.

Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Columbia Machine Works
Consolidated Car Fender Co.
Cummings Car & Coach Co.
Root Spring Scraper Co.
St. Louis Car Co.

Snow Sweeper, Rattan
Heywood-Wakefield Co.

Solder
A. Gilbert & Sons Brass Fdry.

Soldering and Brazing (See Welding Processes and Apparatus)

Solderless Connectors
Frankel Connector Co.

Special Adhesive Papers
Irvington Varnish & Ins. Co.

Special Trackwork
Bethlehem Steel Co.
Lorain Steel Co., The
Wm. Wharton, Jr. & Co.

Spikes
Amer. Steel & Wire Co.
Illinois Steel Co.

Splicing Compounds
U. S. Rubber Co.
Westinghouse E. & M. Co.

Splicing Sleeves (See Clamps and Connectors)

Springs, Car and Truck
American Spiral Spring Co.
American Steel Foundries
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.
Standard Steel Works Co.

Sprinklers, Track and Road
Brill Co., The J. G.
Cummings Car & Coach Co.
St. Louis Car Co.

Stair Steps, Safety
Irving Iron Works

Steel and Steel Products
American Steel & Wire Co.
Carnegie Steel Co.
Illinois Steel Co.

Steps, Car
Brill Co., The J. G.
Irving Iron Works

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse E. & M. Co.

Stop Signals
Nichols-Lintern Co.

Storage Batteries (See Batteries, Storage)

Strain, Insulators
A. & J. M. Anderson Mfg. Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Strand
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Straps, Hand
Central Equipment Co.

Street Cars, Passenger (See Cars, Passenger, Freight, Express, etc.)
Cummings Car & Coach Co.

Structural Steel
American Brown Boveri Corp.

Superheaters
Babcock & Wilcox Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switch Stands and Fixtures
Ramapo-Ajax Corp.

Switches
American Brown Boveri Corp.

Switches and Switchboards
Consolidated Car Heating Co.
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Switches, Magnetic
Monitor Controller Co.

Switches, Remote Control
Monitor Controller Co.

Switches, Selector
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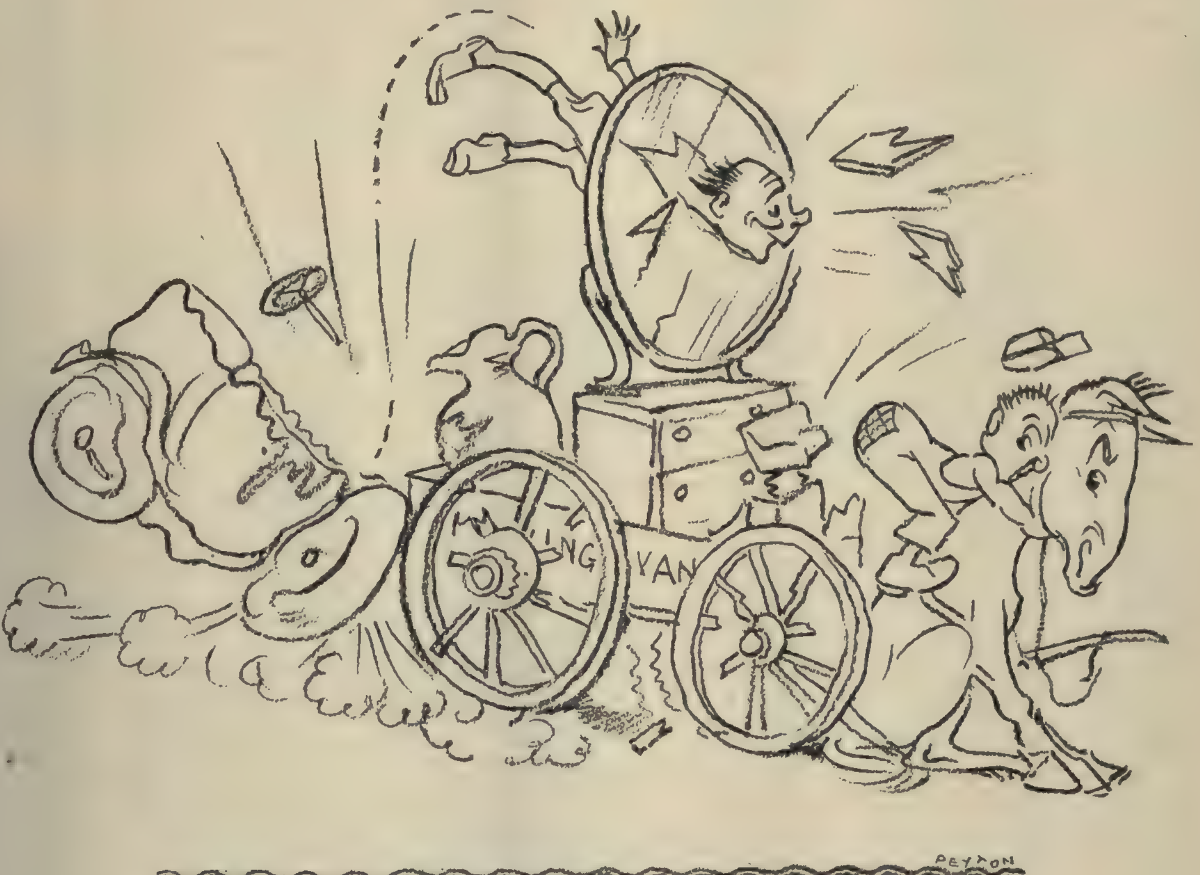

The man feels sorry that he mussed up his car, but what cares he about *breaking the mirror*.

He seems *glad* of the opportunity to disprove the seven years of hard luck following a smashed mirror.

No, gentle reader, he is not inebriated. The poor fellow was born with one of those dizzy complexes which makes a man ignore road signs, speed laws, consumer demand or any fundamentals of safe personal or business conduct.

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ALPHABETICAL INDEX TO ADVERTISEMENTS

Page

A

Acme Wire Co., The..........151
Ajax Metal Co., The..........146
Aluminum Co. of America.....132
American Brake Shoe & Foundry Co. 97
American Brass Co., The.......109
American Bridge Co..........149
American Brown Boveri Elec. Corp. 25-26-27-28
American Car Co..........163
American Creosoting Co.......134
American Electrical Works.....152
American Insulating Machinery Co. 148
American Spiral Spring & Mfg. Co. 146
American Steel & Wire Co.....124
American Steel Foundries 12
American Strombos Co. 144
Anaconda Copper Mining Co....109
Anderson Mfg. Co., A. & J. M..121
Archbold-Brady Co..........150
Asso. of Mfrs. of Chilled Car Wheels 78

B

Babcock & Wilcox Co..........148
Baker-Raulang Co., The....... 59
Bates Expanded Steel Truss Co. 24
Beeler Organization 150
Bell Lumber Co. 152
Bemis Car Truck Co.......... 84
Bethlehem Steel Company..118-119
Bibbins, J. Rowland 151
Brennan, F. J..........151
Bridgeport Brass Co. .Front Cover
Brill Co., The J. G..........163
Buchanan & Layng Corp 150
Buda Co., The.......... 37
Budd Wheel Co.......... 60

C

Cameron Electrical Mfg. Co....152
Carnegie Steel Co.......... 86
Central Equipment Co..........146
Chillingworth Mfg. Co..........142
Cincinnati Car Co..........30-31
Cleveland Fare Box Co..........152
Cleveland Pneumatic Tool Co., The 56
Cleveland Tanning Co., The.... 69
Cole, A. B..........151
Collier, Inc., Barron G....122, 123
Columbia Machine Works & M. I. Co..........104-105
Consolidated Car Fender Co....142
Consolidated Car Heating Co... 79
Continental Motors Corp..........162
Cummings Car & Coach Co...34-35

D

Day & Zimmermann, Inc......150
Dayton Mechanical Tie Co., The Insert 113-114
De Laval Separator Co..........108
Differential Steel Car Co., The..103
Dossert & Co.......... 38

Page

D

Driver-Harris Co..........159
Drum & Co., A. L..........151
Duff Mfg. Co..........125

E

Earll, C. I..........144
Economy Electric Devices Co..16-17
Edwards Co., O. M.......... 68
Electric Equipment Co..........153
Electric Ry. Equipment Co..... 32
Electric Service Supplies Co.... 9

F

Ford, Bacon & Davis..........150
Ford Chain Block Co..........112
Fort Pitt Spring & Mfg. Co....131
Foster Co., L. B.......... 98
"For Sale" Ads..........153
Frankel Connector Co.......... 48

G

Galef, J. W..........152
General Aluminum Products Co. 55
General Electric Co., Back Cover, Insert 39-42
Gilbert & Sons Brass Foundry Co., A. 85
Globe Ticket Co..........136-137
Goodrich Rubber Co.......... 49
Gold Car Heating & Ltg. Co....138
Graham Brothers .....Insert 93-96
Griffin Wheel Co.......... 88

H

Hale-Kilburn Co..........70-71
Haskelite Mfg. Corp..........66-67
"Help Wanted" Ads..........153
Hemphill & Wells..........150
Heywood-Wakefield Co.......... 65
Holst Englehard W..........150
Hubbard & Co..........102
Hyatt Roller Bearing Co....... 82

I

Illinois Steel Co.......... 91
India Tire & Rubber Co....... 58
Ingersoll-Rand Co..........155
International Creosoting & Constr. Co. 117
International Harvester Co..... 53
International Motor Co..Insert 73-76
International Oxygen Co..........152
International Register Co......139
International Steel Tie Co., The. 5
Irving Iron Works Co.......... 90
Irvington Varnish & Insulator Co. 161

Page

J

Jackson, Walter 150
Jeandron, W. J..........146
Johnson Fare Box Co......110-111

K

Kelker, DeLeuw & Co..........150
Kelly, Cooke & Co..........150
Kerite Insulated Wire and Cable Co. 149
Kuhlman Car Co..........163

L

Lang Body Co.........Insert 51-52
Le Carbone Co..........146
Lorain Steel Co..........148
Leece-Neville Co.......... 50

M

Mack Trucks, Inc.....Insert 73-76
McCardell Co., J. R..........147
McClellan & Junkersfeld 150
McCloskey Torch Co..........147
McGraw-Hill Book Co., The....141
Massachusetts Mohair Plush Co. 46
Metal & Thermit Corp......14-15
Mica Insulator Co..........130
Monitor Controller Co..........128
More-Jones Brass & Metal Co., 100-101
Morganite Brush Co., The......145

N

Nachod and United States Signal Co., Inc..........140
National Brake Co.......... 45
National Pneumatic Co.......10-11
National Ry. Appliance Co.....148
Naugle Pole & Tie Co..........151
Nichols-Lintern Co., The......143
Norma-Hoffmann Bearings Corp. 72
Nuttall, R. D..........80-81

O

Ohio Brass Co........Insert 19-22
Ohmer Fare Register Co.......135
Okonite-Callender Cable Co., Inc., The 13, 152
Okonite Co., The.........13, 152

P

Pantasote Co., Inc..........149
Perey Mfg. Co., Inc..........151
Portland Cement Assn........ 77
Positions Wanted and Vacant..153

Page

R

Rail Join Co., The..........120
Railway Track-work Co....... 6-7
Railway Utility Co..........152
Ramapo Ajax Corp..........145
Richey, Albert S..........150
Roebling's Sons Co., John A....152
Roller-Smith Co.......... 29
Rome Wire Co.......... 36
Root Spring Scraper Co........ 99
Russell Burdsall & Ward Bolt & Nut Co. 116

S

S K F Industries, Inc.......... 87
St. Louis Car Co.......... 33
Safety Car Devices 8
Samson Cordage Works 157
Sanderson & Porter 150
Searchlight Section 153
Silver Lake Co..........133
Smith Heater Co., Peter.......152
Stackpole Carbon Co.......... 89
Standard Oil Co..........129
Standard Steel Works Co..106-107
Star Brass Works, The........148
Stevens & Wood, Inc..........150
Stone & Webster 150
Stucki Co., A..........152
Sullivan Machinery Co........140

T

Texas Company, The......126-127
Tool Steel Gear & Pinion Co., The 92

U

Una Welding & Bonding Co.....151
Union Switch & Signal Co..... 18
United States Graphite Co., The.143
Universal Lubricating Co., The..148

V

Valentine & Co.......... 54
Van Loan Corp., Irving S......153

W

"Want" Ads 153
Wason Mfg. Co..........163
Waukesha Motor Co.......... 57
Westinghouse Air Brake Co.... 47
Westinghouse Elec. & Mfg. Co.2, 4
Westinghouse Traction Brake Co. 23
Wharton, Wm., Jr. & Co., Inc..115
"What and Where to Buy," 154-156-158
Wheel Truing Brake Shoe Co...148
White Eng. Corp., The J. G....150
Wish Service, The P. Edw.....151
Wood Co., Chas. N..........152

Y

Yellow Truck & Coach Mfg. Co., Insert 61-64

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Vol. 69
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Pages
67-104

CONTENTS

JANUARY 8, 1927

Editorials 67

Street Traffic Analyzed in Chicago 70

Metropolitan street traffic survey made by Miller McClintock under auspices of the Chicago Association of Commerce contains valuable data on street traffic conditions of today. Recommendations based on future conditions of far-reaching importance. Surface cars found to perform with efficient use of street space.

Reducing Omissions and Errors in Conductors' Reports 76

Birmingham Pleased with Its New Cars 77

Careful attention to local requirements was given in designing the sixteen units just delivered. The cars are truly "all dressed up," but they do not lack for a place to go. Noise reduction and interior decoration are important features.

Electric Railways of Czechoslovakia 79

BY DR. F. NIETHAMMER.

The largest city system is at Prague, where 500 motor cars and 450 trail cars form the equipment. There are also interurban lines in Czechoslovakia and considerable heavy electrification is under way.

Largest Storage Battery Locomotive Demonstrated . 83

Before many witnesses the new 118-ton unit, designed as an intermediate step in electrification, performs switching service in competition with 127-ton M-1 steam locomotive.

Increased Demand for Automotive Service Equipment 85

Purchases in 1926 were the largest of any year of record. Many trucks for miscellaneous haulage purposes were ordered.

The Readers' Forum 86

Buses Extend and Augment Rail Lines 86

Maintenance Notes 87

Pneumatic-Tired Truck for Moving Fenders 87
Location of the Jumper Fuse 87
Commutator Slotter on Lathe Tool Stand 87
Derrick for Lifting Motors and Trucks 88
Pick-Up and Delivery Service for Storeroom 88
New Equipment Available 89
Electric Tie Tamper Has Only One Moving Part 89

Association News and Discussion 90

News of the Industry 91

Recent Bus Developments 95

Financial and Corporate 97

Book Reviews 98

Personal Mention 99

Manufactures and the Markets 102

Hit-or-Miss Reading

STROLL through the reading rooms of a public library and one will be surprised to see how many hit-or-miss readers there are. Particularly is this noticeable in the special reading rooms, where it is a common sight to observe a reader facing a pile of text books and publications, thumbing distractedly first one and then another.

Industry is full of persons whose thirst for knowledge far exceeds their ability to select the proper reading matter. The result is that their minds become lumber rooms cluttered up with useless material.

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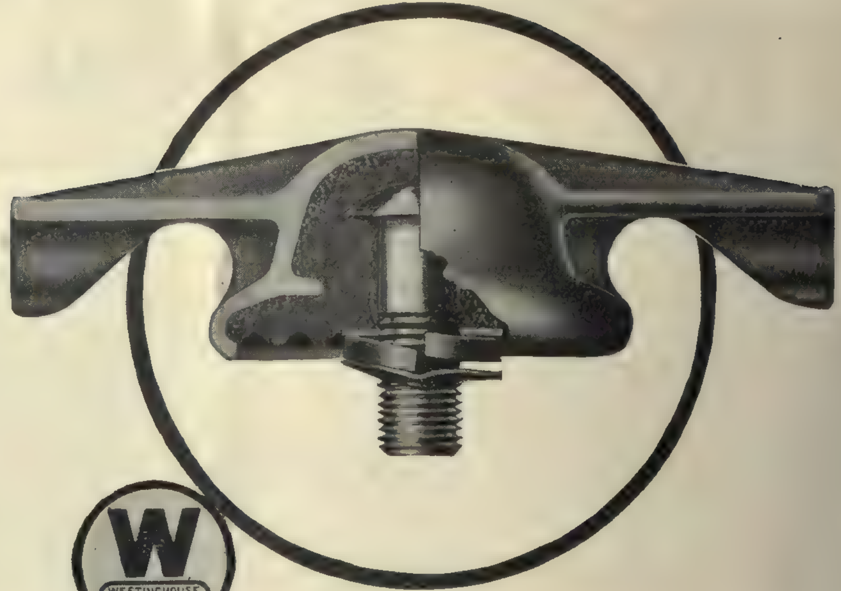
Advertising Index—Alphabetical, 36; Classified, 32, 34, 36; Searchlight Section, 31

Keeping the Overhead *Down* by Keeping it UP



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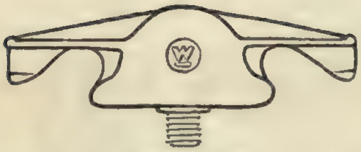
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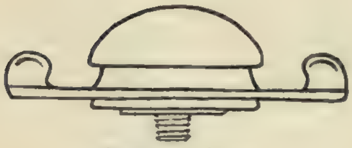
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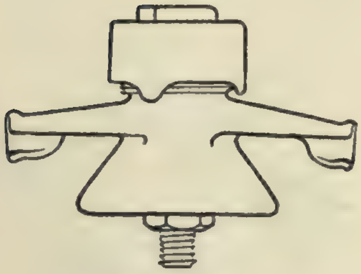
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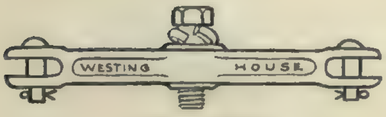

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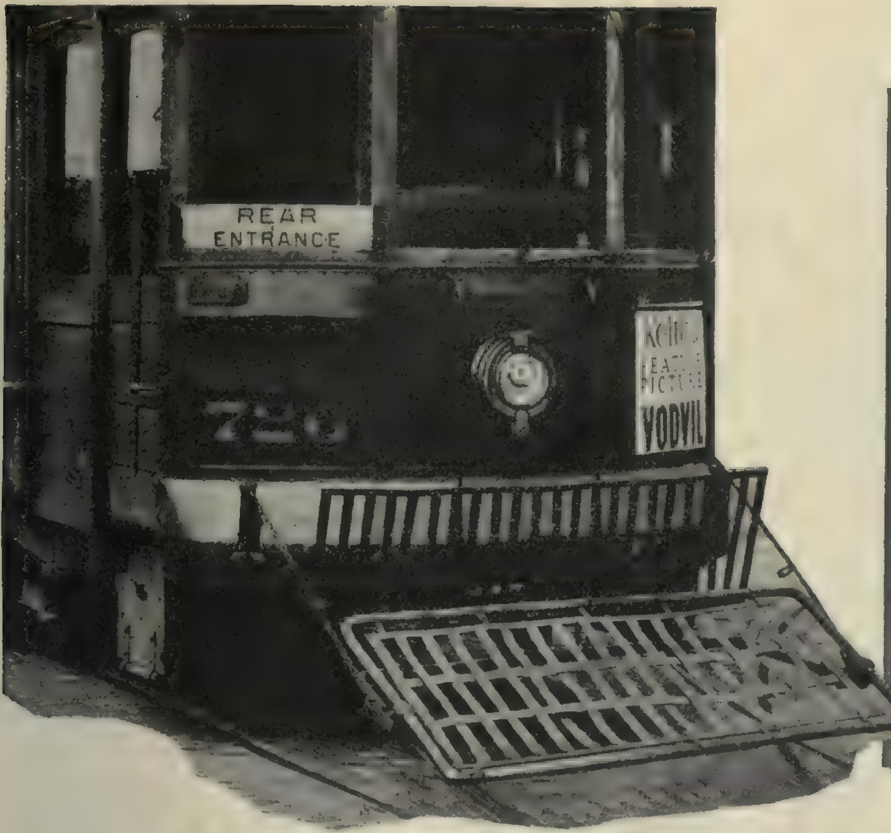

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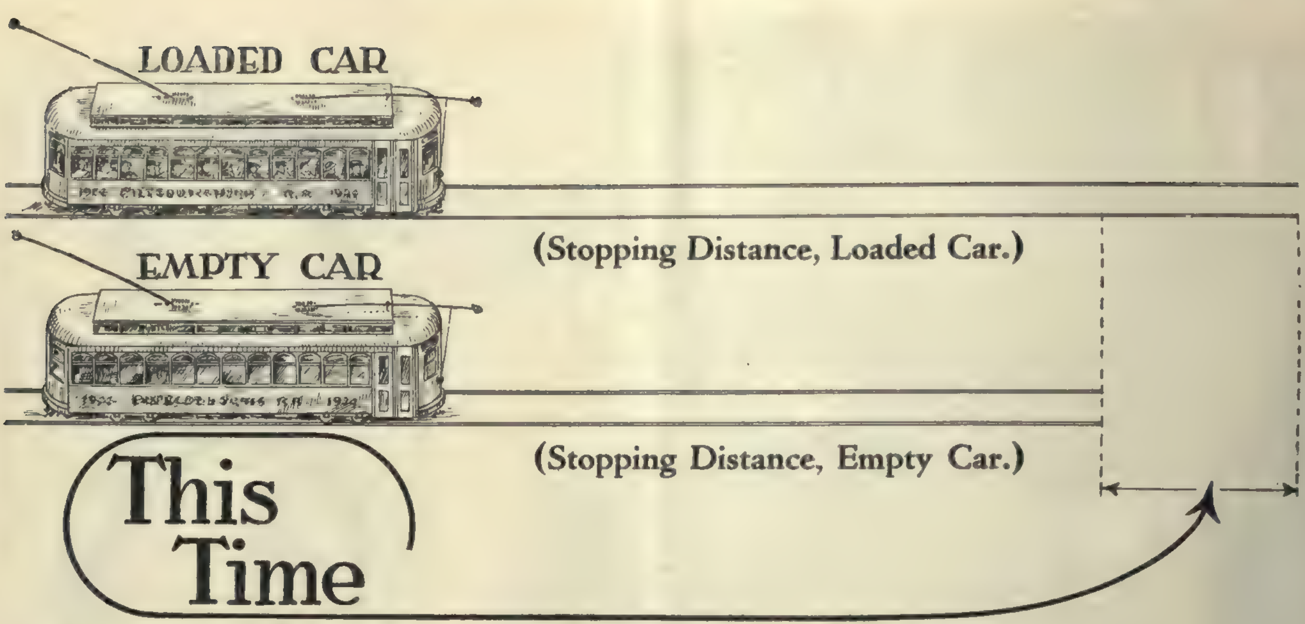
MINING MATERIALS
VALVES


LOADED CAR
EMPTY CAR
(Stopping Distance, Loaded Car.)
(Stopping Distance, Empty Car.)

This Time Can be Saved

Information regarding Westinghouse Variable Load Brakes may be obtained upon application to our nearest district office — *Ask for Descriptive Catalogue T-2045.*

WITH the ordinary form of air brake equipment the maximum retarding force is limited to that which is ample and permissible for an empty car, but which is inadequate to effect the proper degree of control on a loaded car—particularly if it has a high ratio of loaded to empty weight—with the result that the stop is lengthened and more time is consumed.

But this time can be saved!

The Westinghouse Variable Load Brake, adapted specifically for modern light weight surface cars, eliminates the difference in retarding effect on empty and loaded cars—by an automatic adjustment of brake cylinder pressure with the changing load —and insures that stops will be as short under all conditions as would normally be possible only with an empty car.

The saving in time, effected by the uniformly shorter stops, is translated into faster schedule speeds just when time is most valuable—during those periods when there is a demand for quick transportation of large volumes of revenue-producing traffic.

Mass transportation can be accelerated to increase the profit and popularity of your service by the use of this modern brake on your modern cars.

WESTINGHOUSE TRACTION BRAKE CO.
General Office and Works, WILMERDING, PA.

WESTINGHOUSE TRACTION BRAKES

Any type of concrete track can be

Saved . . .
Salvaged . . . Used over

The accepted first step toward lowering track costs

In the first place, the Twin Tie design reduces the construction material 40%. And realizing that concrete and excavation usually make up 82% of the total track cost—you can readily appreciate just how much this 40% savings would mean to you.

Secondly, the experience of the many users of Twin Ties show that track may be laid on Twin Ties with a 50% savings in labor costs.

Actual data on installations and other interesting details are in a booklet that is yours for the asking—Write to The International Steel Tie Co., Cleveland, Ohio.

20% more bearing surface

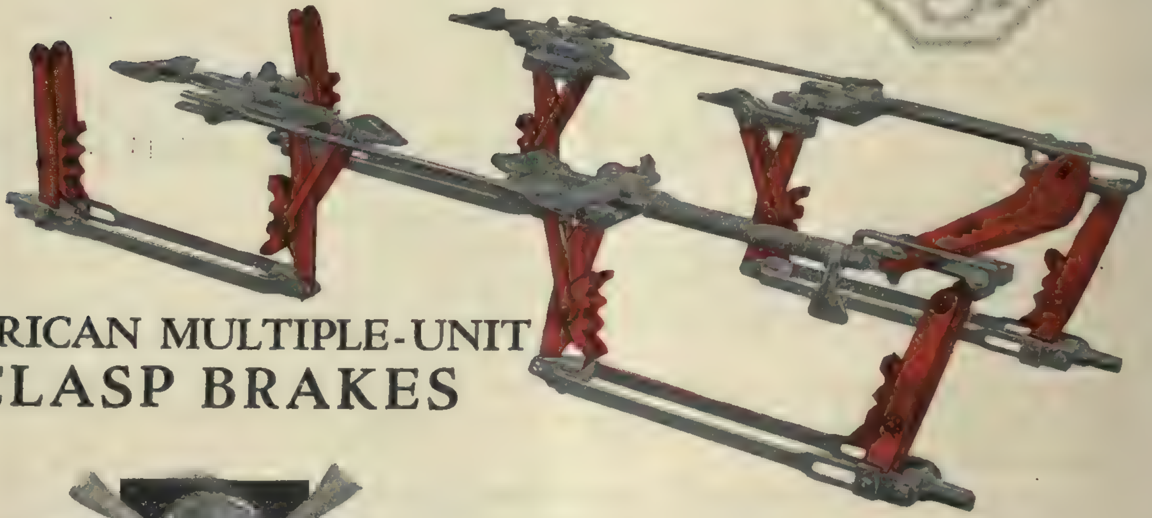
steel Twin Tie track

AS LOGICAL AS THE BALANCING OF SCALES

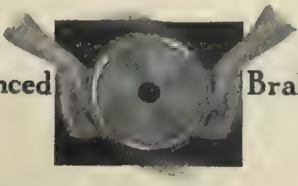
To obtain the unknown weight of an object, by balancing it with known weights was one of the earliest scientific developments. This principle of equalization of forces has had countless practical applications. It is logical.

In the modern railway clasp brake, equal pressure is applied to opposite sides of each wheel, through standard brake shoes, whereas the ordinary practice is to apply the force to one side only. The clasp brake, or balanced braking system, neutralizes the tendency to one-sided wear on journal bearings, pedestals and other truck parts. It affords smoother braking with less heating of brake shoes, and reduces the number of "slid-flat" wheels.

In short—it is the modern and scientific braking system—which is finding increasing favor for heavy traction, and rapid transit service.

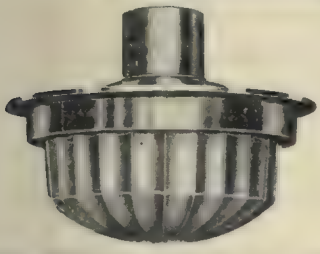


AMERICAN MULTIPLE-UNIT
CLASP BRAKES



AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS



Lighting Fixtures provide a steady, well-diffused light. Manufactured to the Keystone standard of quality, they are both ornamental and durable.

Golden Glow Headlights project powerful, well concentrated beams of light. Made in various styles and sizes to suit every requirement.

Faraday Car Signal Systems fulfill the requirements for convenient reliable passenger signal service.

Hunter-Keystone Destination Signs are an effective way "To tell the public where you're going." Designed to fit any available space.

Keystone Equipment
used by P.-O. Electric Company —1926 Coffin Medal Winner

In the process of putting their divisions on a good, sound, paying basis the Pennsylvania-Ohio Electric Company purchased many new cars having the most modern types of equipment.

On their latest cars for the Youngstown Municipal Railway they put great emphasis upon the lighting system—the fixtures for which are the Keystone-Ivanhoe enclosed type.

Keystone Car Equipment also scored with Golden Glow Headlights, Hunter-Keystone Destination Signs, and Faraday Car Signal Systems.

But this is merely typical of the many generous displays of Keystone Car Equipment found on the newest and most up-to-date cars. *Ask for further particulars.*

ELECTRIC SERVICE SUPPLIES CO.

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO
Illinois Merchants' Bank Bldg.

PITTSBURGH
1123 Bessemer Bldg.

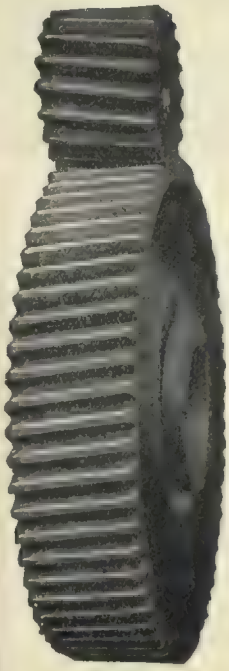
BOSTON
88 Broad St.

SCRANTON
316 N. Washington Ave.

DETROIT
General Motors Building

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver

What Would Happen to Electric Traction If Every Nuttall Gear, Pinion and Trolley Were Suddenly Withdrawn from Service?



Nuttall Helical Gear Set.

That question brings home to you in a vital way the fact that for over thirty-five years Nuttall has been an indispensable factor in the development of electric traction to its present high standards of efficiency and equipment.

Nuttall Helical Gears, the Nuttall BP Process of Heat Treatment, and the Nuttall "One Step Ahead" trolleys, have solved problems that were always drawbacks and annoyances to the industry.

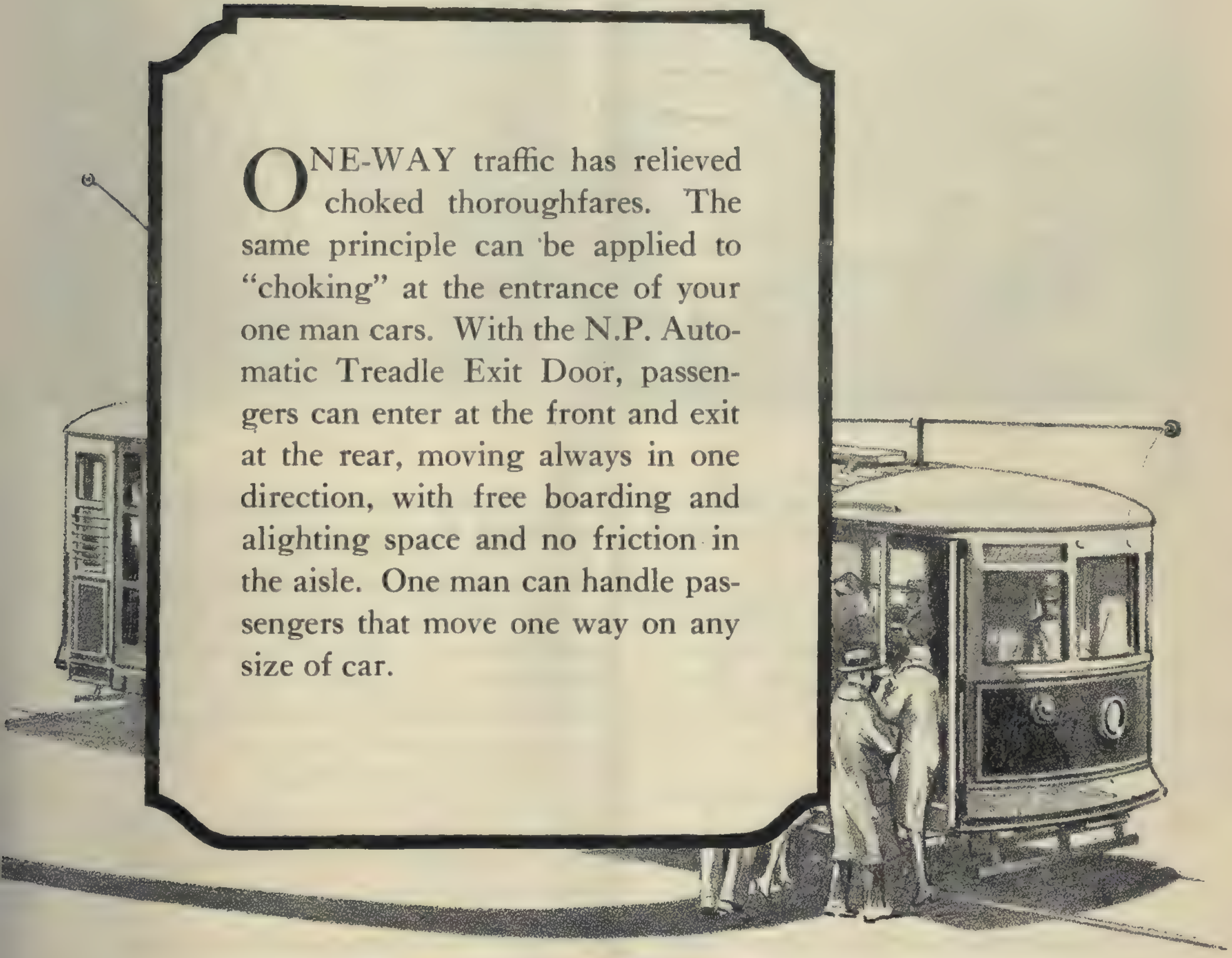
Nuttall US No. 20A Trolley Base Equipped with Timken Roller Bearings.

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

1927

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

Eliminate the "Choke Point" on Your One Man Cars



ONE-WAY traffic has relieved choked thoroughfares. The same principle can be applied to "choking" at the entrance of your one man cars. With the N.P. Automatic Treadle Exit Door, passengers can enter at the front and exit at the rear, moving always in one direction, with free boarding and alighting space and no friction in the aisle. One man can handle passengers that move one way on any size of car.

National Pneumatic Company
Executive Office, 50 Church Street, New York
General Works, Rahway, New Jersey

CHICAGO
518 McCormick Building

MANUFACTURED IN
TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building

What SUPERTWIST Adds to Goodyear Tires

One of the Goodyear-equipped fleet of buses operated by the Yosemite Park and Curry Co.

You know what rugged strength and long life have always been built into Goodyear Pneumatic Bus tires.

Now you may confidently expect even greater service from Goodyears in motorbus service, because Goodyear Pneumatic Bus Tires are now made with SUPERTWIST.

SUPERTWIST is the extra elastic, extra enduring new material specially developed by Goodyear for Goodyear balloon tires, motorbus and heavy duty cord tires.

It far outstretches ordinary cotton cord, and has a maximum flexing power that yields under impact, protecting the tire from rupture, stone bruise and other injuries. It thus insures virtually *double* the *carcass* life of the tire.

Other exclusive features of the Goodyear Pneumatic Tire construction for motorbus service are (1) the new Goodyear band-building method; (2) the new Goodyear breaker; (3) the new Goodyear bead—patent applied for, and (4) the famous All-Weather Tread.

These advantages you get only in Goodyear Pneumatic Bus Tires—the only motorbus tires made of SUPERTWIST.

They are real advantages, because they result in the utmost durability, tractive power, road safety, riding comfort and long, trouble-free mileage at low cost.

Goodyear Means Good Wear

GOODYEAR

Copyright 1927, by The Goodyear Tire & Rubber Co., Inc.

PASSENGER APPEAL

Balanced Design has attacked this problem from *Six Distinct Angles*

1. THE APPEAL OF APPEARANCE. Balanced Design has attained an entirely new standard of car appearance by coordinating every factor of trim, line and exterior finish.

2. THE APPEAL OF COMFORT. Seats, upholstery, flooring, the placement of stanchions and hand-holds, windows and interior trim—each is essentially a part of BALANCED DESIGN. From the time a passenger enters a Cincinnati NEW Car till he alights at his destination, up-to-date comfort invites his patronage.

3. THE APPEAL OF QUIETNESS. Cincinnati NEW Cars are unusually quiet because body bolsters, framing and flooring, brake rigging and under-body equipment have been drastically insulated against noise.

4. THE APPEAL OF SPEED. Balanced Design provides for quick pick-up and improved schedules on all type cars. Where high-speed can profitably be used, it gives you "60 m.p.h. with safety."

5. THE APPEAL OF SAFETY. Modern full safety features are an essential part of Balanced Design. On the high-speed types the new Duplex Air and Magnetic brakes decelerate "from 60 m.p.h. to a full stop in less than 800 feet."

6. CONVENIENT VENTILATION AND LIGHTING. Special care has been taken to assure most convenient placing of windows and lighting relative to seats. Lighting is of most up-to-date type. An entirely novel form of individual ventilation, controllable by passengers, has been developed.

Space forbids further discussion of these advantages in this advertisement. We will gladly go into facts and figures with any interested electric railway executive.

CINCINNATI CAR COMPANY
Cincinnati, Ohio

CINCINNATI
New
CARS

A step ahead of the modern trend

How Cincinnati is solving

1926 view of Spring Grove Ave., Cincinnati, showing use of Carey Elastite System of Track Insulation where the pavement and rails adjoin.

A section of Central Ave., Cincinnati, where Carey Elastite System of Track Insulation is used. Note the perfect condition of the paving where the wood blocks adjoin the rails. Yet this pavement and these rails have carried a continual stream of heavy traffic since 1919.

Scene of one of Cincinnati's more recent installations of Carey Elastite System of Track Insulation—Gilbert Ave., laid in 1924.

the problem of Track Reconstruction and Maintenance

DURING the past year The Cincinnati Street Railway Company used 345,000 lineal feet of Carey Elastite System of Track Insulation.

And Cincinnati will use the same system in future years, too, for it is agreed that this system presents a radical improvement over old methods of track construction. It prevents deterioration of street paving within the track area and brings about a marked reduction in noise. For it forms a lastingly resilient cushion against the stress between rails and paving.

And as in Cincinnati, so in cities all over the country, Carey Elastite System of Track Insulation is greatly prolonging the life of both track and pavements. You can make an excellent investment of a moment's time by having us tell you all about it. Write today for full information.

Carey Elastite System of Track Insulation is a preformed asphaltic compound reenforced with asphalt-saturated fibres. It is impervious to moisture, can be installed at any temperature, and forms a resilient cushion between the rail and the pavement. The slabs are made to fit any rail section, and can be fitted snugly in place by a blow with a sledge hammer.

THE PHILIP CAREY COMPANY, *Lockland,* CINCINNATI, OHIO

Carey
REG. U.S. PAT. OFF.
Elastite
TRADE MARK REGD. U.S. PATENT OFFICE
SYSTEM OF
TRACK INSULATION

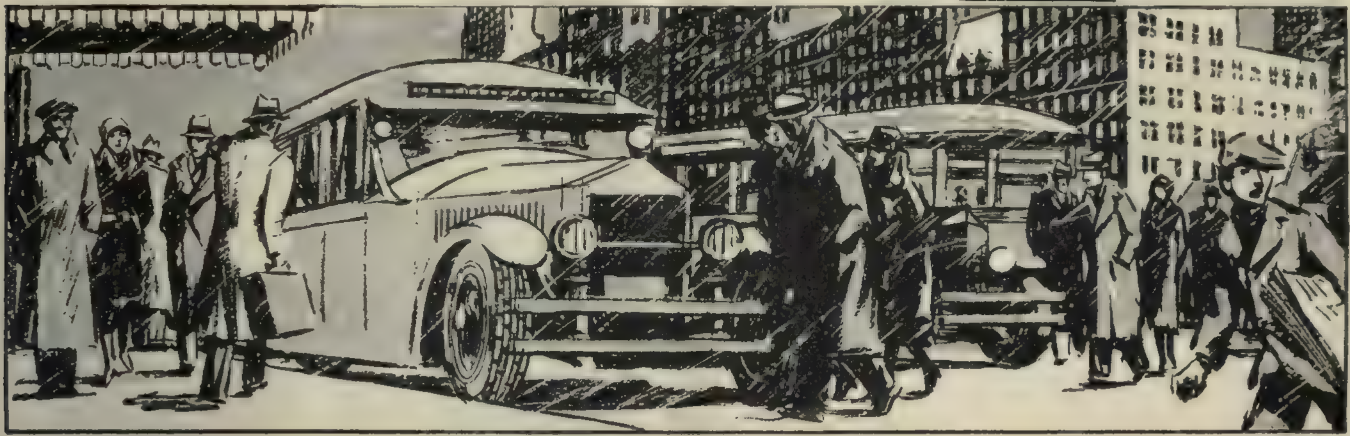
The
Silent
Worm—

its users look upon it as the ideal final drive; for its rugged simplicity, long-lived economy, and noiseless efficiency.

THE TIMKEN-DETROIT AXLE CO., DETROIT, MICH.

TIMKEN
AXLES

UNITED STATES TIRES ARE GOOD TIRES



Motorcoach Operators—North and South Choose the Royal Cord Motorcoach Tire

CHECK the performance of the United States Royal Cord Motorcoach Tire where you will, you will find it delivering uniformly fine service everywhere.

In building this "Modern Tire for the Modern Motorcoach," United States Tire engineers carefully investigated motorcoach operating conditions in every part of the country.

They saw to it that every element that has a destructive effect on a tire is opposed by a type of material and construction to minimize it.

The result is a tire that gives exceptional mileage on motorcoaches operating under widely varying conditions throughout the United States.

For instance, praise for the Royal Cord Motorcoach Tire comes from such widely separated operators as The United Transportation Co. of Albany, N. Y.; The San Antonio Public Service Co., San Antonio, Texas; The Ohio Transit Co., Columbus, Ohio; The Florida Motor Lines, Tampa, Fla.; The New England Transportation Co., New Haven, Conn.

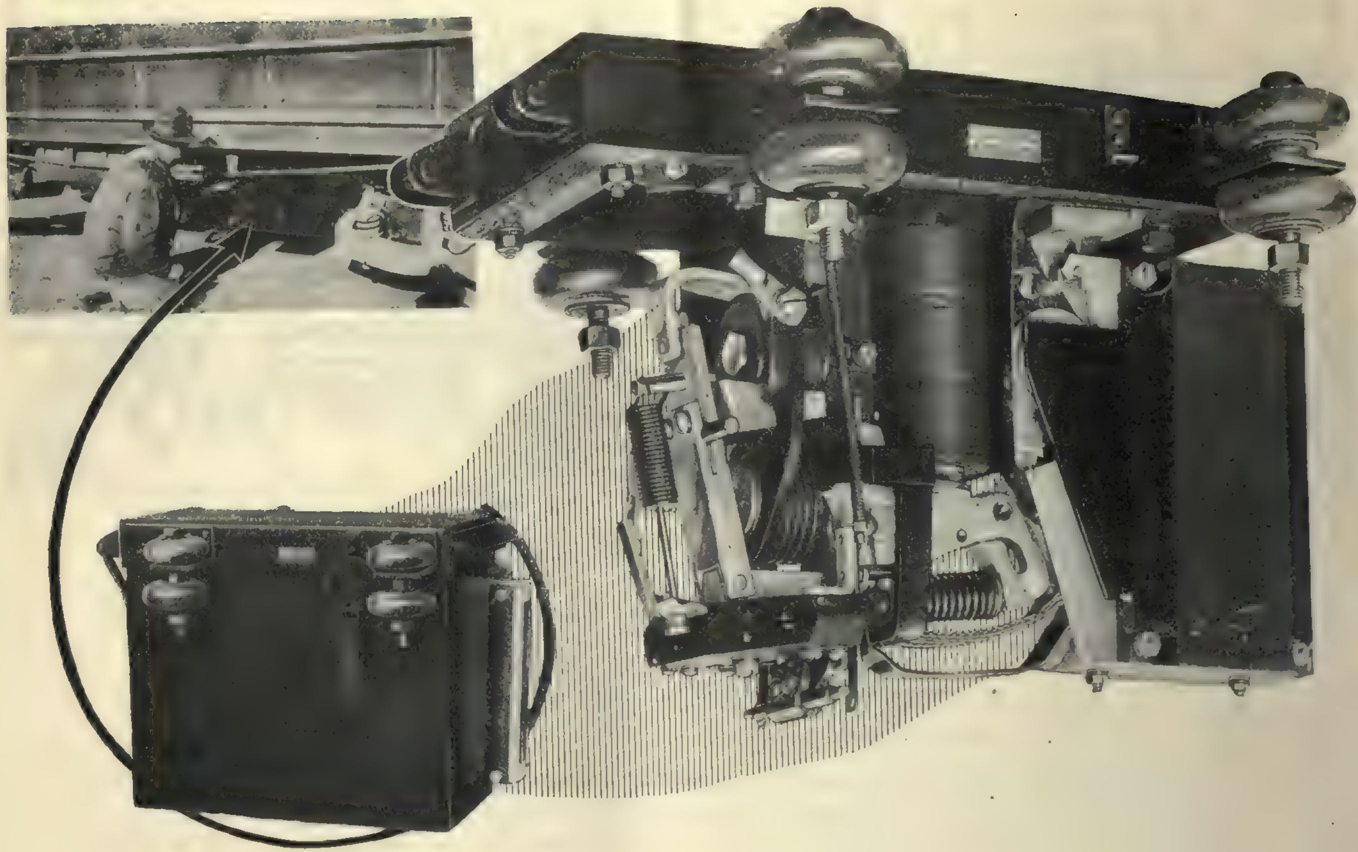
Built for Lowest Possible Cost Per Tire Mile

The United States Royal Cord Motorcoach Tire is a distinct development in tire building. It is *specifically* designed for Motorcoach service. Through the use of *Latex-treated Web Cord*, all cross-tie threads are eliminated. This carcass construction affords maximum strength with maximum flexibility. The rugged anti-skid tread is made of *Sprayed Rubber*—tough, uniform, free from smoke, acid or other impurities.

United States Rubber Company

Trade Mark

UNITED STATES
ROYAL CORD
Motorcoach



As every user will tell you

Under the car, out of the way, the Line Breaker helps solve the perpetual problem of maintaining equipment economically.

It reduces controller contact wear and prevents improper starting and running practices, all of which contribute to high maintenance expense and shortened life of car equipment. It reduces maintenance by eliminating the causes.

The new G-E Line Breakers are exceptionally quick acting and embody many improvements. Ask your G-E railway engineering specialist about them.

General Electric is constantly producing new equipment as demanded by changing conditions and improvements in the railway industry. The G-E Line Breaker is a typical example of G-E developments produced primarily to protect and save equipment.

For
Modern Equipment Standards

330-4

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

Volume 69 New York, Saturday, January 8, 1927 *Number* 2

Design of Standard Freight Car Stimulated Sales

INTERURBAN electric railways are going after freight business with new freight cars. This fact was emphasized by the rolling stock statistics published in the Jan. 1, 1927, issue, which show 198 freight cars ordered during 1926. Of these 147 were ordered by Ohio roads. Nearly all of these cars are the standard design brought out by the Central Electric Railway Master Mechanics' Association in December, 1925. When the group of electric railway equipment men in the Central States got together and agreed on a standard freight trailer, nine companies indicated that their aggregate requirements would be about 150 units. The 1926 statistics show that 13 roads in this district ordered 186 cars. Railways in the Central States were in need of additional freight equipment and by bringing out a standard design sales were stimulated. This certainly is a feather in the cap of standardization, and while passenger cars cannot be standardized so readily, as has been demonstrated already, still the work of passenger car standardization may well be carried much further and many items of equipment standardized with excellent results.

Last Year's Receivership Record the Most Encouraging in Years

MOST encouraging is the record of receiverships in the electric railway industry for the year just completed. As an index of the progress which is being made, it shows clearly the gradual but steady growth of financial stability. The record published in this paper last week shows a material reduction in the number of railways which have been overcome with difficulties and an increase in the number of roads which have been successful in overcoming them.

At the beginning of the year only a few major properties remain under the protection of the courts, and these are rapidly clearing up their difficulties so that it is likely that several of them will emerge from receivership before the end of 1927. Apart from the Chicago Railways, which was thrown into voluntary receivership as a protective measure on account of the political situation, only two roads with 100 miles or more of track went into receivership during 1926. These are the Olean, Bradford & Salamanca Railway and the Utah-Idaho Central Railroad, the latter road having also emerged from receivership in 1926. Both of these are interurbans, as are all but a few of the other defaulting companies. The largest company to come out of receivership and one of the few of its kind still under federal protection was the Kansas City Railways.

True, some companies that never have been in receivership and appear to need the advice most have not made the determined effort that seemed desirable toward carrying out the recommendations for changes in capital structure made by the committee on finance a year ago last October. In brief, these were for voluntary reorganization in such a way as to reduce fixed charges. These companies cannot hope to escape the onus that attaches to this unwillingness on their part in the event that they come into the market for funds. In fact, it would appear that only in this way are some of them likely to undergo changes that certainly appear to be most desirable.

Manufacturers Are Optimistic for the Coming Year

MANUFACTURERS who rely wholly or in part upon the transportation industry for their market are adopting an optimistic attitude toward the twelve months just ahead, based on the theory of continued prosperity. Many of them feel, and with justice, that the railways are slow in sensing the new order of things; leaning over backward to avoid any hint of too impulsive modernization activity and thus defeating temporarily their own best interests. Yet the equipment men call attention to the increasing momentum of the modernization campaign and look to the immediate future for a widespread acceptance by the public of the indispensability of electric railways.

Some of those who pin their faith on the theory of invariable business cycles are inclined to be skeptical concerning the ability of American industry to prevent the periodic recurrence of serious business depressions. They have overlooked, however, the various checks which have been set up by industry to forestall any such declines. So-called hand-to-mouth buying is coming more and more into general practice, not only by transportation companies but by all classes of business; manufacturers are in much closer touch with their particular markets than formerly and they are now able to control production to suit demand; prices have been maintained at very stable levels, if anything declining slightly in the face of heavy purchasing requirements, thus indicating that production costs are being pared to a satisfactory minimum; foreign markets are being consistently developed by American industry and may prove a valuable stop-gap in the event of a temporary slowing down of consumption here.

Hence it seems reasonable to assume that the electric railway industry, in common with other fields of business, may plan ahead for expenditures needed in equipment replacements and service improvements, having confidence that in the coming year ample revenues will be forthcoming.

Equipment manufacturers are convinced, for the most part, that 1927 will be marked by greatly increased purchasing by the electric railways and are preparing for a degree of production undreamed of during the lean period of the past few years. The railways have been slow to react to the national prosperity, yet one is reminded of the proverb: "All things come to him who waits."

Stabilization of the Industry Should Stimulate Purchases

STABILITY of electric railway costs was a matter of comment a year ago. The study of fares, operating and construction costs and wages, conducted by Prof. Albert S. Richey, then indicated a remarkable degree of stabilization. This year a similar study by Professor Richey, published last week, indicates that the fluctuations have become even less marked than before.

The charts in his article show remarkable freedom from violent changes in the various index numbers considered. Fares, for instance, had a maximum range between 151.2 and 153.2, or 1.3 per cent. While this is slightly more of a change than the 0.9 per cent variation in 1925, it indicates the remarkable degree of stabilization that has been reached. On the expense side, electric railway operating materials showed a fluctuation between 153.1 and 159.2, or 4 per cent, as compared with 5.7 per cent the year before. Wages have advanced from 223.8 to 226.8 or 2.1 per cent, against 0.9 per cent in 1925. Electric railway construction costs moved between 201.3 and 203.7, or 1.2 per cent, a reduction from the 2.6 per cent of the previous year. As in the earlier year, wholesale prices of all commodities went down, receding from 156.0 to 148.1, or 5.3 per cent, as against 3.6 per cent in 1925 and 7.9 per cent in 1924. The average of these fluctuations for the past year is only about half of the average of a year ago.

Last year's prediction of stabilized costs is thus borne out. All information available points to a further continuation of stability throughout the present year. There is thus every reason why the industry may go forward with confidence and plan for the future on the basis of known conditions. In particular this applies to contemplated purchases. There is every reason for not putting off improvements involving labor or materials because of a possible recession in prices. There is every reason why the alert railway management should go ahead with the knowledge that changes in the prices will be minor, and that there even may be a saving in cost through buying now, as well as getting the advantage of using improved facilities.

Will the Railways Rebuild or Renew Their Cars?

WHILE the JOURNAL'S forecast based on data received from many companies points to an expenditure of $55,000,000 for equipment in 1927, a close study of the individual returns discloses the interesting point that not all this money will go for new cars. Much of the budget is for capital expenditures on old cars. The 1926 figures of actual accomplishments also bear out this conclusion, because that is exactly what many of the roads did do. How far this tendency will go in the future depends on the appeal of the modern car designs of 1927.

In many cases no brief can be held against this practice of rehabilitation, even though gross mistakes have been made in the past by expenditures on old equipment unwarranted from the standpoint of value received. Often such a policy is forced by financial conditions as the lesser of two evils. Many managers are thoroughly convinced of the advantage of new as against rebuilt equipment, but are unable to convince their financial backers. The public, too, may not be as thoroughly convinced as might be desired. The points of superiority in the latest type cars have not impressed themselves on the manager so that he can produce an argument strong enough to do a complete selling job to his bankers and often to his public.

Here lies the crux of the new car situation in the industry. As long as the conventional designs of twenty years ago form the background of modern design, bankers as well as patrons, who are once removed from actual contact with the details of operation, may not be convinced readily of the superiority of new over old or rebuilt cars.

What is needed is the grip of some master hand. In the emergency of the late war a group of engineers went into a prolonged conference on airplane motor design and after a period of intensive work emerged with the Liberty engine. Perhaps the same treatment is in order again for the street car. The demands for noise reduction, higher speeds and greater comfort are so intense that fundamental changes may be necessary from the type of construction now so generally adopted. Public favor extended to buses is largely because of their newness and improved seat comfort and reduction of noise.

The extent to which the industry will be persuaded in the future to devote its capital budget to new cars as against rebuilding old ones will be in no small measure determined by the sales appeal of the product offered in the immediate future. The improvements of the bus must be capitalized and added to others possible in rail car construction.

Terminable Permit Law Recommended by Illinois Committee

STRICTLY in line with the bulk of modern thought on franchise matters is the recommendation of the sub-committee of the Illinois terminable permit commission that the terminable permit is superior to the definite term franchise. It does not see in that form of grant any reason to doubt the ability of the cities adequately to protect themselves, but it does see in that form of grant a stabilizer, particularly so far as the grant carries reasonable assurance of continuity of the enterprise to the investors who make the enterprise possible. In particular the committee was impressed with the soundness of the argument that grants of this type tend to take the utilities out of politics. As a result of its deliberations the committee recommends that appropriate legislation be adopted at this session of the General Assembly to remove the present limitation of twenty years as the maximum term for which franchises may be granted to street railways and authorizing the issuing of the terminable permit.

The suggestion is entirely reasonable that these permits be made only under such terms and conditions as may be deemed wise by the Assembly to insure continuous and efficient operation of the utilities and to protect the public as to service and rates and the rights of the utility to the streets. To this end the suggestions could be followed that are intended by the National

Association of Railroad and Utilities Commissioners to be included in the uniform terminable permit law now under consideration by the National Conference Commission on uniform state laws. That body, be it recalled, regards the principle of the indeterminate permit as economic and sound, and urges the legislatures of the various states which have not yet adopted the principle of the indeterminate permit to enact legislation recognizing and putting such principle into effect.

A previous attempt to make possible a terminable permit failed in the 1925 Legislature through opposition on the part of the city of Chicago and some down-state interests. Following this the legislative commission that has just reported was created to investigate the operation of the terminable permit in other states and its feasibility in Illinois. Legislative bodies are usually deliberate in their actions, so there appears little likelihood that a permit law of this kind will be passed before the expiration of the present Chicago Surface Lines franchises on Feb. 1, but there would seem to be little reason to doubt that the present unfortunate conditions that surround the surface railways in Chicago would have been avoided had the companies there been under some such form of grant.

Railway, Bus and Taxis Under One Head in Twin Cities

NO LITTLE interest should attach in electric railway circles to the announcement made elsewhere in this issue of the purchase of the leading Minneapolis cab company by the Twin City Rapid Transit Company. It is the second largest purchase of the kind reported in this industry. Both the governing principle of co-ordination behind the matter and the extent of the purchase are significant. So far as the former goes the railway in the Twin Cities is said now to control all the interurban passenger bus services and some suburban lines entering the city, a program in which the first move was made several years ago. As to its extent, the purchase just made includes about 500 cabs.

It is too early to say just what plans will eventually be worked out for tying all the services together, but one thing is sure, duplication of the organization and the facilities of the taxi companies has been a source of unnecessary traffic congestion. True, control of the taxicabs in the Twin Cities, together with the ownership of the railway and the bus lines, gives the parent company virtual control of public transportation service, but that service is under the control of the city and the state. Such an arrangement is anything but inimical to the best interests of the traveling public. In fact, under proper regulation and control it is just the reverse. Far too often it is difficult to make the so-called man in the street see that there is no advantage to him in the duplication of transit facilities, but such is a fact nevertheless.

President Lowry rightly believes that the proposed unification will best serve the public interest in that it will be possible to give more efficient and better service. He believes that, given time, the company can clearly demonstrate that the transaction is a sound and logical one. It most certainly is. But there will be need for the exercise of care in working out the details. The suspicion that one form of service may be advanced to the detriment of another—a bugaboo easily conjured in the public mind—should be carefully guarded against. Co-ordination of railway and bus in the Twin Cities has been effected with such celerity, however, that it may well be presupposed the articulation of still another form of transportation activity with those that already exist will be carried out no less wisely than have other similar moves. As stated before, it is a significant move this, one which managers everywhere may well ponder carefully, whether or not the situations that confront them would seem to make a similar move by them desirable.

Chicago's Survey of Street Traffic a Masterful Report

STREET traffic in Chicago has finally reached that uncomfortable degree of congestion where representative business men are demanding that something be done to correct the situation. To this end the Chicago Association of Commerce, representing the business interests of the city, has made an extensive study and definite recommendations tending to alleviate the serious conditions that exist today.

The report just published by the association was undertaken at the invitation of the City Council, although financed by the association. It has a convincing appeal because of the extensive studies made and the abundance of data collected under the direction of Dr. Miller McClintock, director of the Erskine bureau for street traffic research of Harvard University. The survey forms the basis of the article appearing in this issue of the JOURNAL.

The report keeps close to the subject of traffic on street surfaces. Apparently it was not written to prove any preconceived theories or to favor any one agency. It might almost be said that undue favor was shown the private car operator despite the convincing evidence of his uneconomic use of the public thoroughfares. The inadequacy of curb parking and the resulting congestion is shown, however, and parking in the Loop would be prohibited during the day in favor of the development of extensive "off-street" parking areas and garages.

Of special interest to the railway industry is the story gleaned from many sections of the report of the efficiency of the street car as a transportation agent. The bus, too, makes an efficient showing, but so far has not been developed extensively in Chicago.

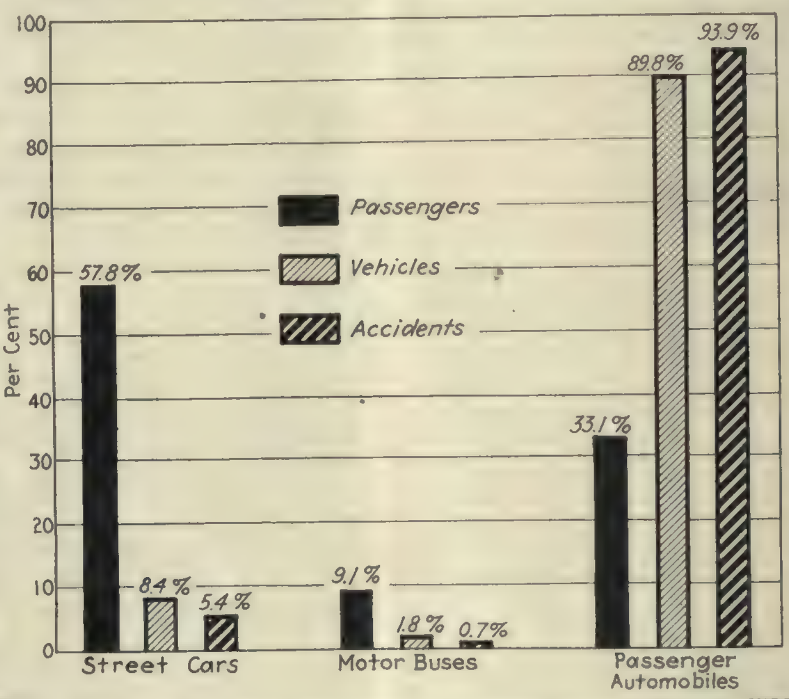
Sixty per cent of the people entering or leaving the Loop by street agencies use the cars. This, however, requires only a little more than 8 per cent of the vehicles evident during the day, and according to police records the surface cars and elevated combined are involved in but 5.4 per cent of the accidents. Compare this with the 33 per cent auto riders using 90 per cent of the vehicles and producing directly or indirectly 94 per cent of the street accidents!

More convincing than ever are these facts, coming as they do from unbiased sources. The entire report is perhaps the most extensive study yet made on street traffic, and while its conclusions are far reaching, they are not visionary. At the present conditions merely foreshadow those that will exist in the future. The appeal is made to lay the groundwork for common sense regulation that will help the traffic flow rather than hinder it. Chicago, as well as other great cities, may well face the facts and prepare along sound lines to meet this situation that even now seems almost baffling.

Street Traffic Analyzed in Chicago

Metropolitan Street Traffic Survey Made by Miller McClintock Under Auspices of the Chicago Association of Commerce Contains Many Valuable Data on Conditions as They Exist Today—Recommendations Based on Forecasts of the Future Are of Far-Reaching Importance—Surface Cars Found to Perform Efficient Transportation Service

WITH a full realization that the streets of a city are the most important element in its economic usefulness, the Chicago Association of Commerce undertakes to make basic recommendations for the future use of such arteries that will give the greatest service to all. The recommendations contained in the Metropolitan Street Traffic Survey of the street traffic of Chicago and the 40-mile territory adjacent to it are simple and do not involve enormous expenditures. Segregation of various kinds of traffic, improved regulation tending to produce a more efficient use of the streets and provisions for safety are fundamentals on which the recommendations are based.



Comparison of Mass Transportation by Street Cars with Mass Traffic by Automobiles

More than 800,000 people using vehicles on the streets enter or leave Chicago's central district each day between 7 a.m. and 7 p.m. Note the efficiency of the street cars and buses as compared to the private automobiles.

Story Gleaned from Chicago's Street Traffic Survey

These data show the utilitarian value of the surface car as a means of handling the masses with a minimum of vehicles and accidents.

	Passengers Carried		Vehicles Used		Accidents	
		Per Cent		Per Cent		Per Cent
Street cars.........	568,925	57.8	16,901	8.4	212*	5.4
Motor buses.......	89,369	9.1	3,633	1.8	29	0.7
Passenger autos....	325,524	33.1	180,846	89.8	3,705	93.9
Totals..........	983,818	100.0	201,380	100.0	3,946	100.0

* Includes elevated and surface cars, no segregation being given. Number of accidents are for the three months of May, June and July, 1926, and cover the entire city under the jurisdiction of the Police Department.

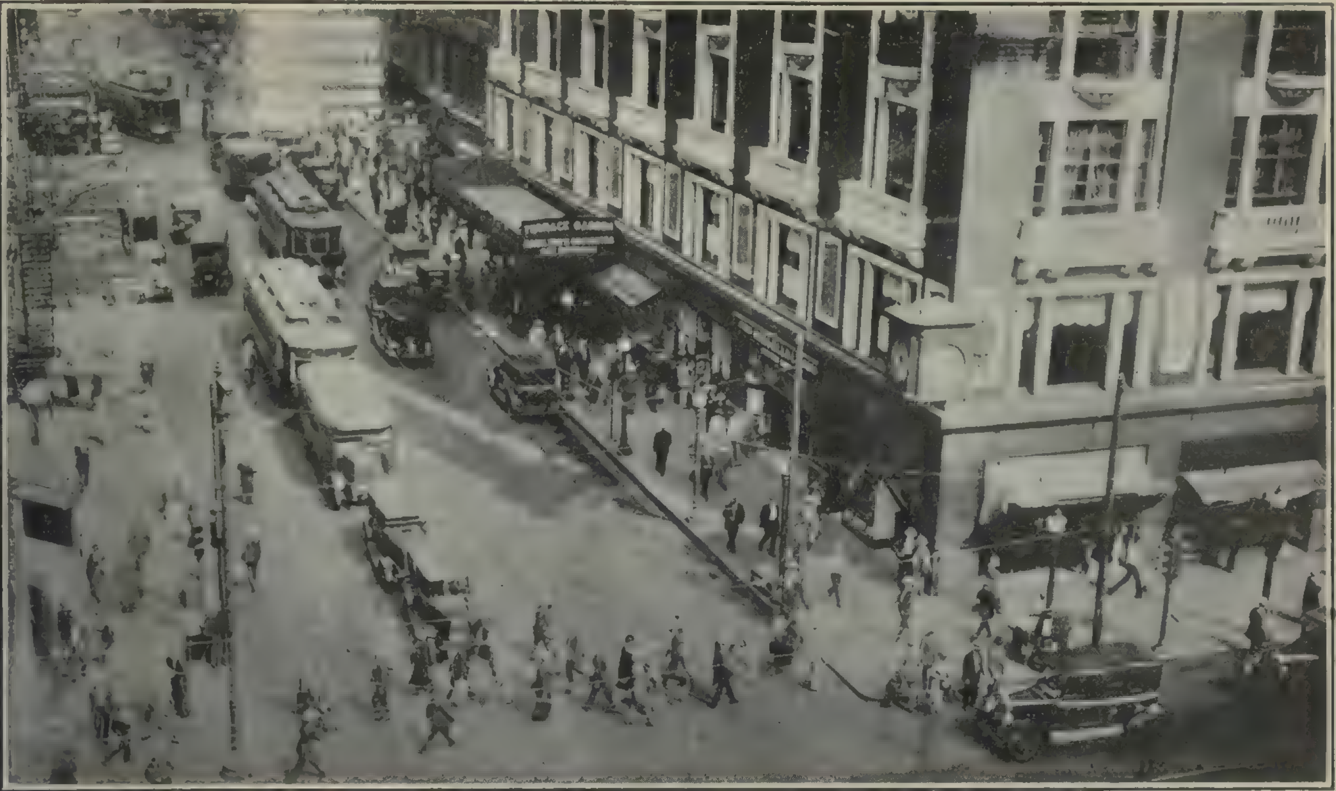
A proposed traffic ordinance defining the methods of vehicle operation with suitable rules and regulations is included in the report. Formation of a street traffic commission, twelve members in all, including the Mayor, the commissioner of public works, corporation counsel, superintendent of police, the president of the board of local improvements, chief justice of the Municipal Court, the commissioner of gas and electricity, chairman of the Chicago Plan Commission and one representative from each of the political subdivisions of greater Chicago, is recommended to act as the co-ordinating body on all matters related to street traffic. In addition, a division of traffic engineering is planned to work as a function of the bureau of streets under the jurisdiction of the Department of Public Works.

Reorganization of the traffic division of the Police Department is deemed necessary in the administration of the proposed traffic ordinance. "Firmer and more systematic enforcement of traffic law in the courts" is also considered necessary to improve conditions. In this connection the report states that "Traffic laws will be obeyed without compulsion in direct ratio to their reasonableness." While the police responsibilities are many, and the function of arrest of willful or careless violators is minor, the fact that this class of violators is responsible for so many accidents and loss of life and property should cause it to be systematically followed up and summarily dealt with through the courts.

Regulation and not punishment is of perhaps greater importance, and to this end the report deals at length with traffic signs and signals to guide the motorists and to provide greater freedom of movement with a lessened accident hazard.

As told in the ELECTRIC RAILWAY JOURNAL in the issue of Dec. 25 this survey was made by the Chicago Association of Commerce under the direction of Dr. Miller McClintock, head of the Albert Russel Erskine bureau for street traffic research in Harvard University. The report of the survey was directed to the Mayor and Chicago City Council and signed by William R. Dawes and Elmer T. Stevens, president of the association and chairman of the street traffic committee, respectively. Functioning with Dr. McClintock and the technical staff was the administrative board of the Chicago Association of Commerce and eleven advisory committees on as many distinctive subjects.

As a basis for the suggestions offered, the survey presents a vast array of traffic statistics that indicate the thoroughness of the work. Space permits the reproduction of only a few of the salient findings, and those



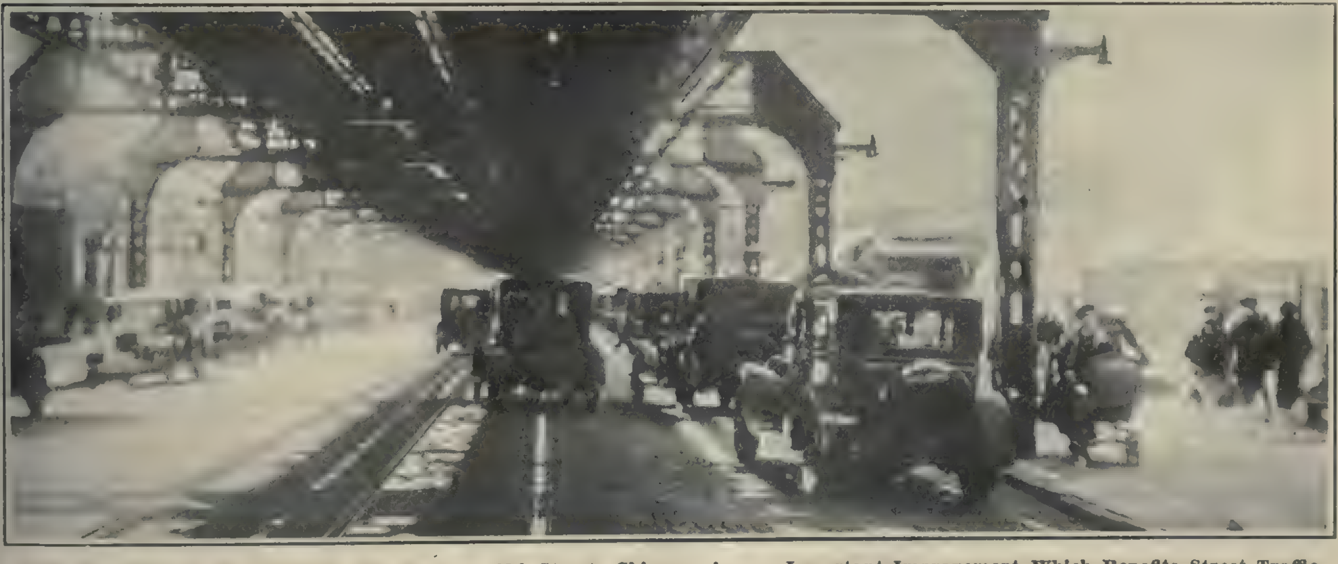
Absence of Loading Zones and Adequate Traffic Regulation Delays the Progress of Street Cars and Their Larger Number of Patrons. In This Typical Instance Two Private Automobiles and a Bus Prevented an Electric Car from Approaching the Corner Despite the Fact that the Curb Lane Was Unobstructed

of greatest interest to the electric railway industry have been selected.

It is self-evident from the charts and tables reproduced that surface car performance stands supreme in its utility as a transportation agent. About a million people come into the central business district every day. According to the cordon count of this district made in May, 1926, exactly 1,693,506 persons entered or left this district in the twelve-hour period from 7 a.m. to 7 p.m. on the average weekday. Assuming that all who entered the district left it the same day it would appear that 846,753 persons, or 25 per cent of Chicago's population, went downtown to work or shop every day during these hours alone.

The count indicated that 80.8 per cent of these people used mass transportation agencies, as shown in an accompanying table, and 19.2 per cent used private automobiles. Likewise, 58.1 per cent used street agencies and 41.9 per cent "off-street" agencies such as steam roads, elevated or electric interurban.

The relative importance of the street car is of particular interest. An accompanying table and chart indicate that the street cars entering the Loop carry 57.8 per cent of all people using street agencies, buses carry 9.1 per cent, and 33.1 per cent ride downtown in automobiles. The disproportionate street occupancy of these different classes supports the street car still further. The 57.8 per cent of car riders required but 8.4 per cent of the vehicles, while the 33.1 per cent of automobile passengers required 89.8 per cent of the vehicles.

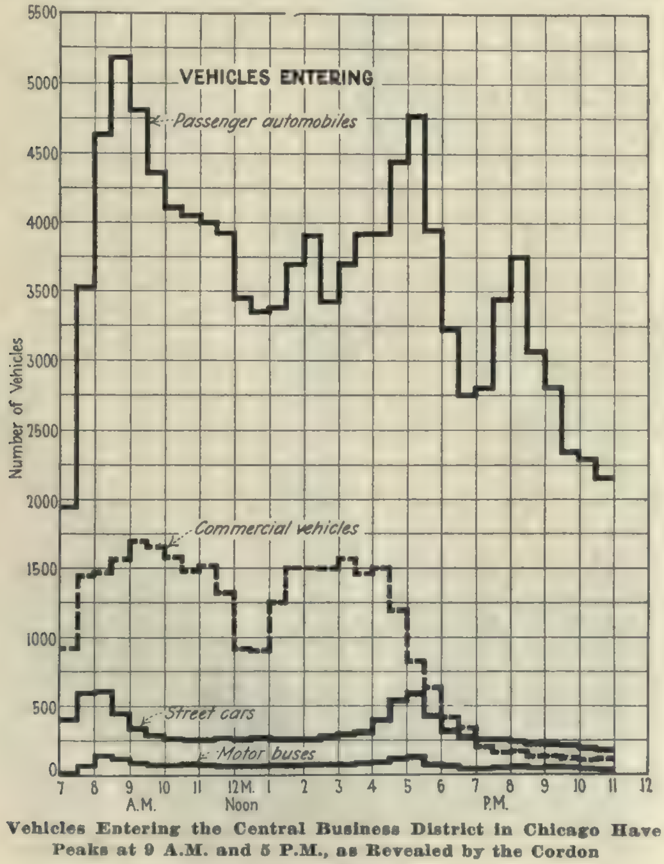


Curb Supports of the Elevated Structure on 63d Street, Chicago, Are an Important Improvement Which Benefits Street Traffic

Sidewalk Obstructions Impede the Progress of Pedestrians at Busy Intersection in Chicago and Should Be Removed, According to the Recommendation of Miller McClintock

From another part of the report it is disclosed that only 5.4 per cent of accidents for the three-month period May to July, 1926, inclusive, reported by the Police Department involved street cars or elevated trains, 0.7 per cent buses and 93.9 per cent private automobiles. No segregation is given as between surface and elevated cars in the accident data.

Despite the less efficient use of public streets, the report distinctly recognizes the economic value of the private automobile, saying in part: "Automotive transportation has wrought a basic modification in man's attitude toward time and distance and has had a fundamental effect upon every aspect of urban life. It is inevitable that such a change should necessitate many readjustments in private business and in public administration. The manufacturers of automobiles have gone far in fitting their vehicles for conditions under which they must operate. From now on it is necessary that some more constructive steps should be taken in adjusting operating conditions to the needs of the vehicle."



Vehicles Entering the Central Business District in Chicago Have Peaks at 9 A.M. and 5 P.M., as Revealed by the Cordon Count of the Chicago Street Traffic Survey

Further on the report states "that the increasing automotive use in the past quarter of a century is only a forecast of what will take place in the future. All considerations of street traffic conditions, and all plans, both in the way of street design and in traffic control, must take cognizance of the fact that the problem of street congestion and street safety is only beginning, and that the burdens of the future will be much larger than those of the present."

With a population of 3,048,000, the city of Chicago has a motor vehicle registration of 341,468—probably slightly less than the actual number owned and operated in the city. For 1950 the population has been estimated at 4,380,000 and the motor vehicles at 876,000. The loading at present is 8.9 persons per car and in 1950 is estimated at five persons per car. For the metropolitan district, assumed for the report as the territory within a 40-mile circle, the population is estimated in 1950 as 6,408,500 riding in 1,281,700 motor vehicles.

Industrial Workers Heavy Users of Street Cars

Mode of transport used by 95 per cent of the 37,946 employees of the Hawthorne plant of the Western Electric Company, shown in the Chicago Street Traffic Survey. Most of these employees come to work between 7:30 and 8:30 a.m.

	Per Cent
Surface cars	60.2
Elevated	13.3
Steam (C., B. & Q.R.R.)	2.6
Automobiles	2.6
Walked	17.8
Unidentified	3.5
Total	100.0

CERTAIN FACTORS HAVE INCREASED STREET TRAFFIC

Freight terminals that form a fringe around the central business district on the north, west and south, with the docks on the east, add the greatest amount of traffic burden to the business streets. During the month of March, 1926, 69,508,959 lb. of freight in 13,806 loads was moved in interterminal transfer alone over the streets of the central district. In addition, dock to freight terminal movements during the same month amounted to 16,283,879 lb. in 1,803 loads. This does not include freight having origin or destination points in the central district, but means transfer shipments via street surface only. It is of interest to note that the Chicago Tunnel Company handles almost an equal poundage in its elaborate system of tunnels under the central district.

Natural barriers such as Lake Michigan and the rivers are cited in the report as greatly complicating the city growth. The lake has caused a semi-circular plan of development and the rivers require adequate bridge facilities. The river traffic often causes serious delays due to open bridges.

Paved streets are considered essential. The report emphasizes that "the most direct physical relief that could be brought to the Chicago traffic problem would be an energetic and comprehensive paving program."

Despite the increase of paved streets the automobiles have increased faster. In 1908 there were only 3.8 automobiles per mile of paved street, whereas in 1925 there were 139. Street design is discussed. High crowns cause discomfort and difficulty in steering, especially of trucks. This results in greater use of the center or top of the crown and seriously affects street capacity and safety.

On traction streets the rails often form the smoothest riding, resulting in an uneconomical street usage and delay to surface cars. Rounded curbs at corners facilitate turning movements of automobiles and reduce the accident hazard of such movements. Elevated pillars also reduce street capacity and the report contains a recommendation for their removal to the curb. Public and private encroachment on street and sidewalk space should also be minimized.

A Quarter of Chicago's Population Goes to Work or Shop Daily in the Central Business District

The cordon count of the Chicago Street Traffic Survey reveals the utility of the street car as the most important and efficient street agency in use today, as well as the carrier of the largest group of riders.

Mode of Transportation	Number of Passengers	Per Cent
Street car	568,925	33.6
Elevated	473,736	28.0
Steam railroad (suburban)	192,909	11.4
Steam railroad (through)	29,173	1.7
Electric interurban	13,870	0.8
Motor bus	89,369	5.3
Passenger auto	325,524	19.2
Total	1,693,506	100.0
Mass transportation	1,367,982	80.8
Passenger auto	325,524	19.2
Total	1,693,506	100.0
Street agencies	983,818	58.1
"Off-street" agencies	709,688	41.9
Total	1,693,506	100.0

A lack of adequate regulation is responsible for much congestion. Irregular turning movements and unnecessary use of the streets also add to traffic density. Taxicab operation is cited as an indication of dead traffic and a count was taken during a typical business day at State and Madison and also at the Link Bridge. At State and Madison 1,218 cabs, or 26.3 per cent of those observed, were loaded and 3,429, or 73.7 per cent, were empty. At the Link Bridge 2,893, or 49.3 per cent, were loaded and 2,973, or 50.7 per cent, were empty. A total of both points observed indicated that 60.9 per cent of the taxicabs were empty and is an indication of the cruising habits of this class of carrier, although many cabs may have been moving to and from calls.

COST OF CONGESTION AND ACCIDENTS HIGH

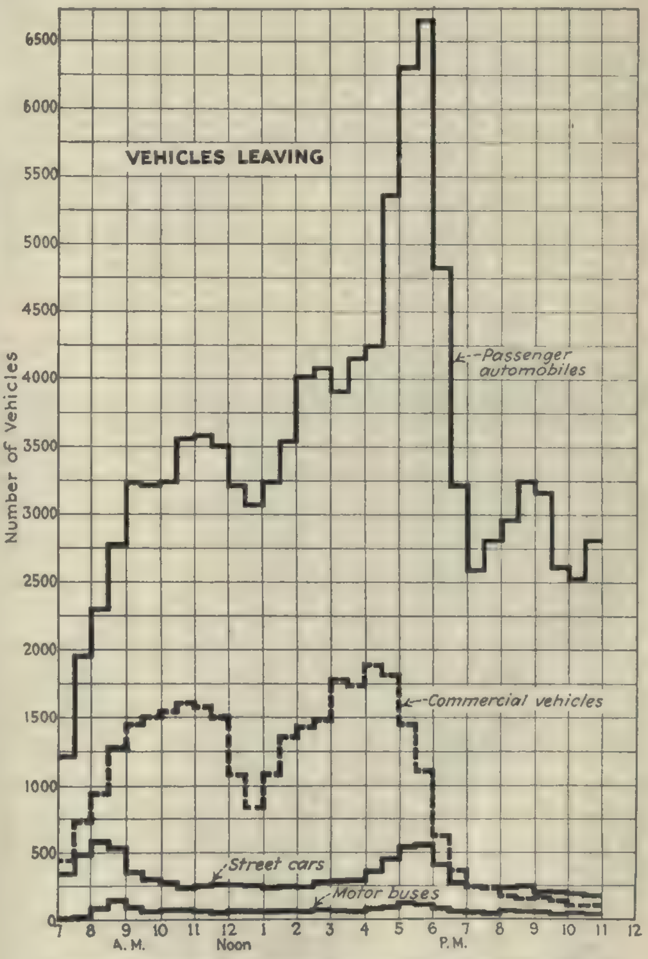
Decentralization is the direct product of congestion. In Chicago this is true as in other cities, such as New York, Boston and Los Angeles. Chicago now possesses 75 major and 20 minor neighborhood or package goods districts. Also 173 outlying banks exist with deposits of $615,000,000. This is cited as the result of a demand for greater accessibility, especially by automobile patronage.

On the assumption that 10 per cent of the unit hours of work could be saved by partially relieved congestion a daily saving could be made of $75,820, or $27,215,200 annually.

Accidents, in addition to the above, are estimated to cost $17,000,000 annually.*

When Parked Cars Absorb the Paved Traffic Lane at the Side of Narrow Streets the Moving Vehicles Use the Tracks to the Detriment of the Masses

Of the motor vehicle fatalities in the United States, numbering 22,500 for 1925, Chicago contributed 2.9 per cent. A study based on May, June and July, 1926, indicated that the frequency of accident occurrence was much greater between the hours of 5 and 6 p.m. and is attributed to the greater fatigue of motorists and pedestrians at this time of day, as well as the increased congestion. A chart on page 74 indicates this situation and another shows the vehicles involved in accidents.



Vehicles Leaving the Central District Form a Higher Peak than When Entering

The greater peak is just before 6 p.m., immediately following a secondary peak of vehicles entering this district, as shown by chart on opposite page.

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*If all the automobiles and trucks operating in Chicago were insured for public liability and property damage at the prevailing rates the total premium would approximately equal this sum.

How 96,000 Patrons of Mercantile Establishments Arrived in Downtown Chicago

Based upon this extensive series of interviews covering one day the Chicago Association of Commerce would ban all parking in the central district of Chicago, bounded by Wacker Drive on the north, Michigan Avenue on the east, Harrison Street on the south and Market Street on the west, between the hours of 7 a.m. and 6:30 p.m.

Establishments	Total Patrons	Suburban Trains	Per Cent	Elevated Trains	Per Cent	Street Cars	Per Cent	Motor Coach	Per Cent	Taxicabs	Per Cent	Automobiles Totals	Automobiles Per Cent	Automobiles Park at Curb	Automobiles Per Cent
Department stores	68,621	12,875	18.5	23,176	33.3	19,370	27.8	8,881	12.7	709	1.0	4,610	6.70	1,013	1.47
Office building	9,432	2,334	24.7	3,404	36.0	1,906	20.2	505	5.5	85	0.9	1,198	12.70	167	1.77
Banks	8,421	1,900	22.6	2,884	34.3	2,308	27.4	405	5.3	79	0.9	800	9.50	144	1.71
Musical instrument stores	2,649	499	18.8	1,016	38.4	567	21.4	315	11.9	42	1.6	210	7.90	61	2.29
Furniture stores	2,378	449	18.8	855	36.0	498	21.0	291	12.3	22	0.9	263	11.0	45	1.88
Shoe stores	1,064	158	14.9	311	29.2	169	15.8	211	19.8	33	3.1	182	17.2	32	3.02
Restaurants	2,405	507	21.0	748	31.1	343	14.3	307	12.8	122	5.1	378	15.70	41	1.69
Book stores	112	20	17.2	25	21.6	30	25.8	20	17.2	.....	...	21	18.20	2	1.74
Grand total	96,082	18,742	19.5	32,419	33.8	25,191	26.2	10,980	11.4	1,092	1.1	7,662	8.00	1,505	1.57

A reduction of 23 per cent of personal injury automobile accidents has been noted in the five months following the installation of the co-ordinated traffic signals in the Loop, in addition to reducing materially street car and vehicular running time in this district.

TRAFFIC MUST BE CONTROLLED

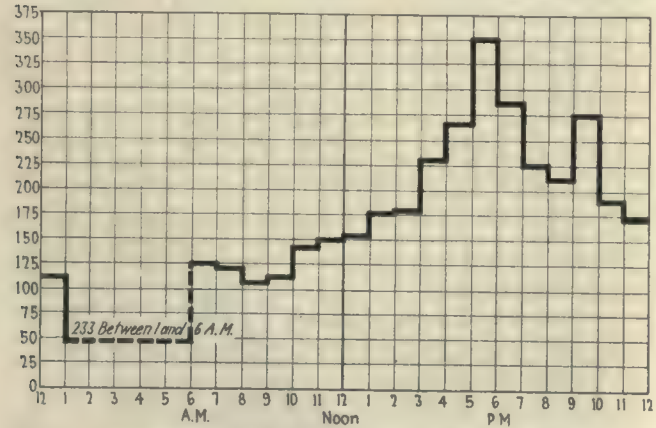
One chapter is devoted to the control of traffic. Street cars should be given the right of way by requiring vehicular traffic to avoid blocking tracks when cars are approaching. Street car stops should be provided with clearly defined safety zones and vehicle drivers must not be allowed to drive through such zones, whether occupied or not.

Surface cars should minimize loading time in the central district by using street loaders and change makers where possible. Motor coaches should be provided with clearly marked loading points arranged not to interfere with surface car loading zones. Recessed curbs the width of the bus could be provided in certain streets. Buses should never be allowed to load while standing in the second lane from the curb.

The valuable results obtained by prohibiting left turns in the central district have been somewhat impaired by permitting left turns in the middle of the block. Observations made indicate that 78.8 per cent of such turns caused delays that when reduced to a man-minute basis averaged 6.84 minutes per turn.

THE PEDESTRIAN NEEDS PROTECTION

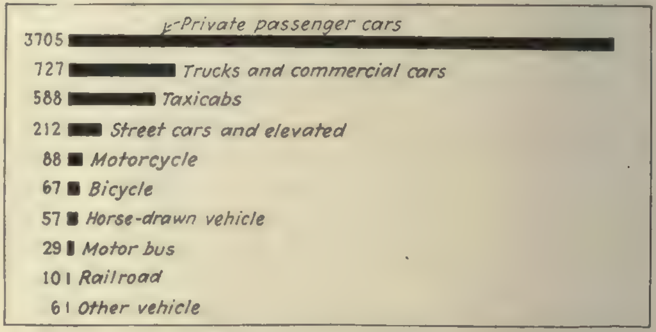
Checks show that pedestrian speeds average 3.16 m.p.h. on typical streets in the central district, which is reduced to 2.81 m.p.h. with the congestion of the late afternoon hours. An observation on a Saturday in May, 1926, showed that 195,930 people entered the intersection at State and Madison in five afternoon hours. The peak hour showed 49,250 persons and the peak quarter hour 13,190.



Frequency of Motor Vehicle Accidents by Hours

Fatigue and peak traffic combine to produce the greatest number of accidents between 5 and 6 p.m.

From these and other observations the conclusion is drawn that pedestrian traffic on sidewalks as well as at street intersections must be regulated. Sidewalk obstructions must be removed, stopping midstream must cease and all possible causes of congregations must be eliminated. Pedestrian subways under Michigan Avenue to the Illinois Central station have proved practical and checks show their use is in excess of the original estimates. The report carries the recommendation that pedestrian subways be used at other places, but not in congested streets because of the difficulty of providing approaches.



What Causes Accidents?

The chart here shows the type of vehicle involved in all motor vehicle accidents in Chicago for months of May, June, July, 1926 Most of the accidents involve private passenger cars. Surface cars and elevated trains, although providing the background of passenger transportation, have very few accidents.

THE PARKING PROBLEM

The parked cars of the few must give way to transportation of the many. Parking checks were made in five square blocks of the central district which had a possible parking capacity of 300 cars. Observations revealed the fact that the average number parked between 7 a.m. and 7 p.m. was 170, or 57 per cent of the maximum possible. The hour from 2 to 3 p.m. is the peak, during which time 231, or 77 per cent of the maximum number, were parked. The present regulation calls for a half-hour parking limit, but the check revealed the fact that 1½ hours is the average duration of parking time.

Surveys in outlying business districts indicate that three hours is the average parking time and the peak hours are at night.

Within the area bounded by the elevated loop there is a curb footage available for parking sufficient to accommodate 1,157 vehicles at one time. If the half-hour parking limit was rigidly adhered to 27,768 vehicles could be parked in a twelve-hour day. This would accommodate but 15 per cent of the demand placed upon the streets of this district. The primary effect on street capacity of this small accommodation is a reduction of 30 to 50 per cent. The secondary effect is that little or no space is available for the actual loading and unloading of passengers and merchandise.

Basic reasons for traffic regulation are greater safety and improved business. The first is obvious. To determine the latter some 96,000 patrons of different firms were interviewed. Of these 90.9 per cent arrived by common carriers, 1.1 per cent by taxicabs and 8 per cent by automobile. Of the latter only 1.57 per cent parked their cars at the curb. This complete check is shown in tabular form on page 74 and is one of the most important features of the report.

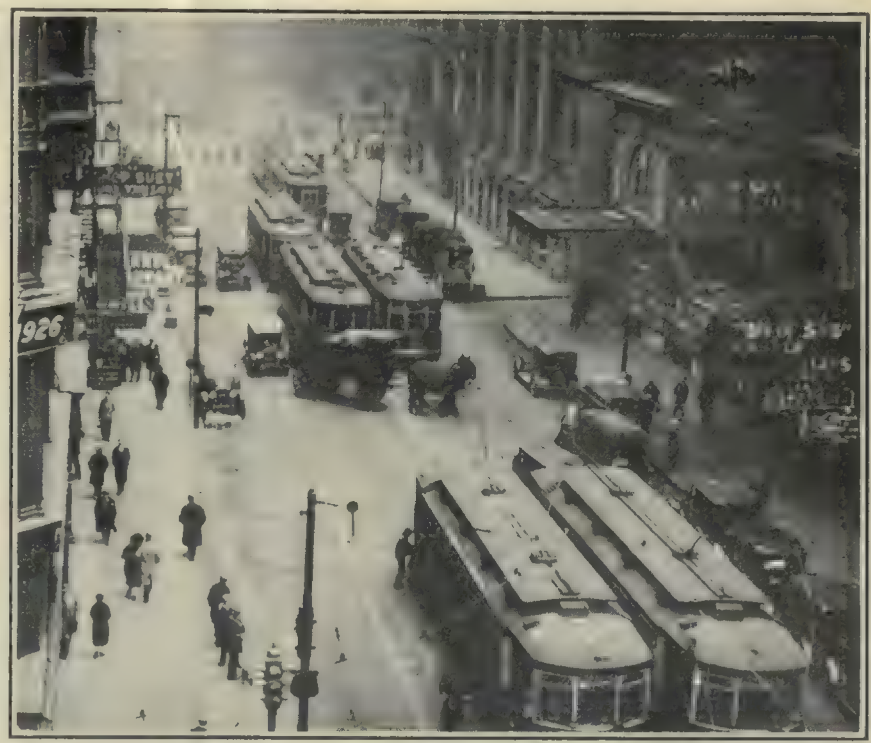
Based upon the extensive series of interviews which tends to blast the mistaken idea of the value of parking facilities to merchants on congested streets, the Association of Commerce recommends that parking for longer periods than necessary actually to load or unload passengers or merchandise be entirely prohibited in the central district between the hours of 7 a.m. and 6:30 p.m. The construction of garages and off-street parking areas is urged, as is also the further development of Grant Park, now accommodating hundreds of machines.

Outlying business districts should also be limited by empowering the commissioner of public works to erect signs, and the Police Department to enforce a two-hour parking limit between 7 a.m. and 6:30 p.m.

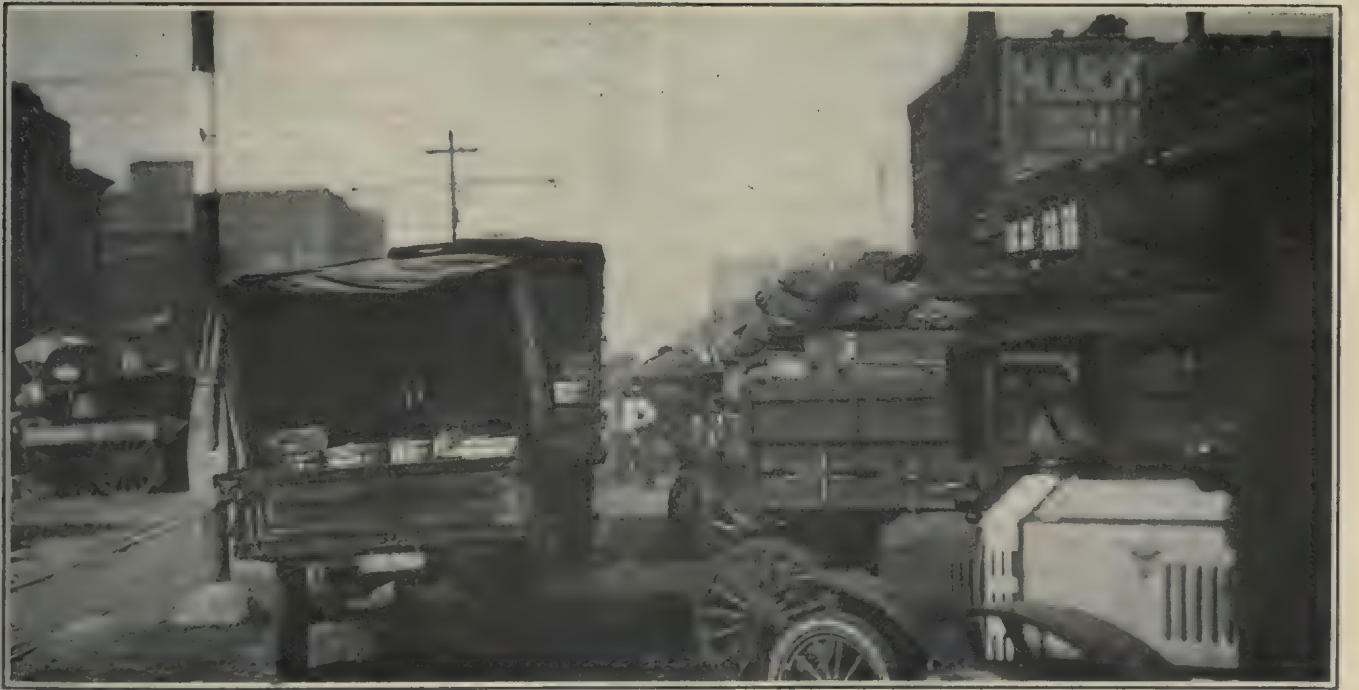
MORE TRAFFIC SIGNS AND SIGNALS NECESSARY

"Stop and go signals should rarely, if ever, be installed for purely safety purposes. The primary purpose of the signal is to start and stop traffic to facilitate movement." Boulevard stops and other warning and guiding signs are recommended to help the motorists in rapid although safe movement. Installation of automatic "stop" and "go" signals at points where traffic conditions do not warrant such regulation invites a violation of such signals and thus creates a dangerous habit. It would be one of the duties of the proposed engineering division to avoid impracticable signals.

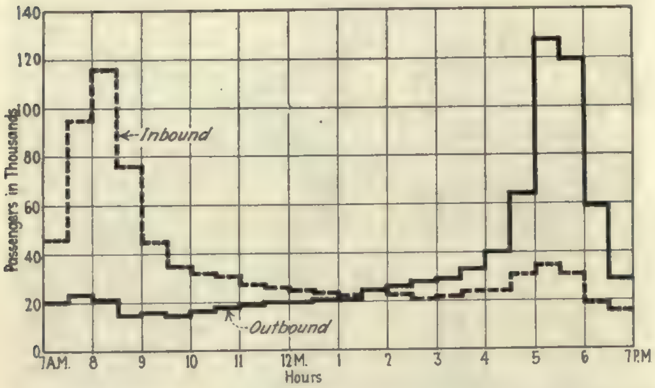
The co-ordinated system in the Loop has proved so successful that its extension to other districts is recommended. Much space is used in the discussion of the amber light. The report favors relatively a longer



With the Abolition of Left Turns in the Chicago Loop, Midstreet Turns Are Permitted, but with Inevitable Delays, as Illustrated



Angle Parking on Narrow Chicago Streets Leaves Only the Track Area Free for Moving Vehicles period, and that it should be shown alone without the red or green. The amber light should stop all vehicular traffic and be used for pedestrian crossing. No signal should be "dead," and when the signals are not necessary during late evening and night hours the amber light should be arranged to flash "on" and "off" as a caution warning.



Passengers Entering and Leaving Central Business District in All Forms of Transportation for One Typical Day in May, 1926, between 7 A.M. and 7 P.M.

Peak load ratios of five to one greatly congest the arteries connecting Chicago's central district with the residential portions. Mass transportation and "off street" facilities greatly lessen the street burden during these hours.

To avoid confusion, there should be a standardization of signal and sign types and of systems used.

TRAFFIC POLICE AND THE COURTS

Two chapters are devoted to an analysis of the traffic police division and the traffic courts. A complete reorganization of the traffic police division is recommended and firm and uniform handling of traffic violators on the part of the courts is urged.

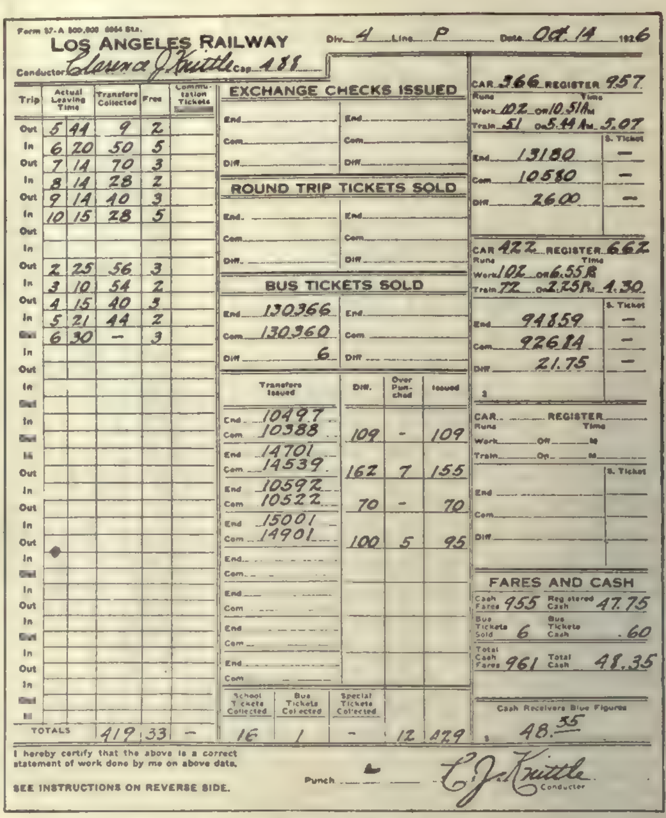
Centralization of administrative responsibility is recommended and suggestions are made for the formation of a Chicago traffic commission and a department of traffic engineering.

Reducing Omissions and Errors in Conductors' Reports

REGISTER CARDS, trip sheets and all other forms on which trainmen of the Los Angeles Railway, Los Angeles, Cal., make their reports have been evolved through a careful study of various errors and omissions on previous forms. The forms used have been simplified so as to require only information that is absolutely necessary.

In 1920 the number of omissions and errors on trip sheets, register cards, etc., used by the Los Angeles Railway was so great that the auditing department devised and put into use a form calling to the conductor's attention his omissions and errors. At that time such reports covering the trip sheets for one day were sent to 60 per cent of the conductors then in service. By the continuous use of this form thereafter this percentage has been reduced to a normal figure. Now the work of conductors on trip sheets, register cards, ticket and transfer turn-ins on the whole is more than 95 per cent accurate.

A careful survey of the records relating to the work done by conductors for the first nine months of the present bonus year led the auditing department to list those who were doing the best work on such reports. The points considered were legibility, neatness, accuracy, completeness and apparent special effort, and the method used in weighing and combining these points segregated the men into the following classes: Very poor, poor, average, good and exceptionally good. The names of 232 men in the good class and 73 in the exceptionally good class were given to the manager of transportation with the auditor's recommendation that they be awarded merits.



Form 37-A 500,000 6064 Sta.
LOS ANGELES RAILWAY Div. 4 Line P Date Oct. 14 1926
Conductor Clarence J. Knittle Cap. 481

Trip	Actual Leaving Time		Transfers Collected	Free	Commutation Tickets
Out	5	44	9	2	
In	6	20	50	5	
Out	7	14	70	3	
In	8	14	28	2	
Out	9	14	40	3	
In	10	15	28	5	
Out					
In					
Out	2	25	56	3	
In	3	10	54	2	
Out	4	15	40	3	
In	5	21	44	2	
Out	6	30	—	3	
In					
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In					
TOTALS			419	33	—

EXCHANGE CHECKS ISSUED
End ______ End ______
Com ______ Com ______
Diff ______ Diff ______

ROUND TRIP TICKETS SOLD
End ______ End ______
Com ______ Com ______
Diff ______ Diff ______

BUS TICKETS SOLD
End 130366 End ______
Com 130360 Com ______
Diff 6 Diff ______

Transfers Issued	Diff.	Over Punched	Issued
End 10497 Com 10388	109	-	109
End 14701 Com 14539	162	7	155
End 10592 Com 10522	70	-	70
End 15001 Com 14901	100	5	95
End Com			
End Com			
End Com			
End Com			

School Tickets Collected	Bus Tickets Collected	Special Tickets Collected		
16	1	—	12	429

CAR 366 REGISTER 957
Runs Time
Work 102 On 10.51 A.M.
Train 51 On 5.44 A.M. 5.07
End 13180 — (S. Ticket)
Com 10580 —
Diff 26.00 —

CAR 422 REGISTER 662
Runs Time
Work 102 On 6.55 P.
Train 72 On 2.25 P.M. 4.30
End 94859 — (S. Ticket)
Com 92684 —
Diff 21.75 —
3

CAR ______ REGISTER ______
Runs Time
Work ______ Off ______ to
Train ______ On ______ to ______
End ______ (S. Ticket)
Com ______
Diff ______

FARES AND CASH
Cash Fares 955 Registered Cash 47.75
Bus Tickets Sold 6 Bus Tickets Cash .60
Total Cash Fares 961 Total Cash 48.35

Cash Receivers Blue Figures
$ 48.35

I hereby certify that the above is a correct statement of work done by me on above date.
SEE INSTRUCTIONS ON REVERSE SIDE.
Punch
C. J. Knittle
Conductor

Conductor's Trip Sheet as Used by the Los Angeles Railway

Some of the reminders which are given the conductor and have been of assistance in reducing errors are as follows:

The time for out and in trips should be the actual leaving time as shown by the conductor's watch, and in accordance with printed instructions.

The hours and minutes work on each car should be shown in the space immediately to the right of the "On and Off" time. This should be given separately for each car. Also, the "On and Off' time should show whether it is a.m. or p.m.

Some conductors show only the portion of the ending and commencing numbers of bus tickets and round-trip tickets sold. The entire number should be given in order that the auditing department may be able to trace any particular ticket or make an analysis of ticket traffic.

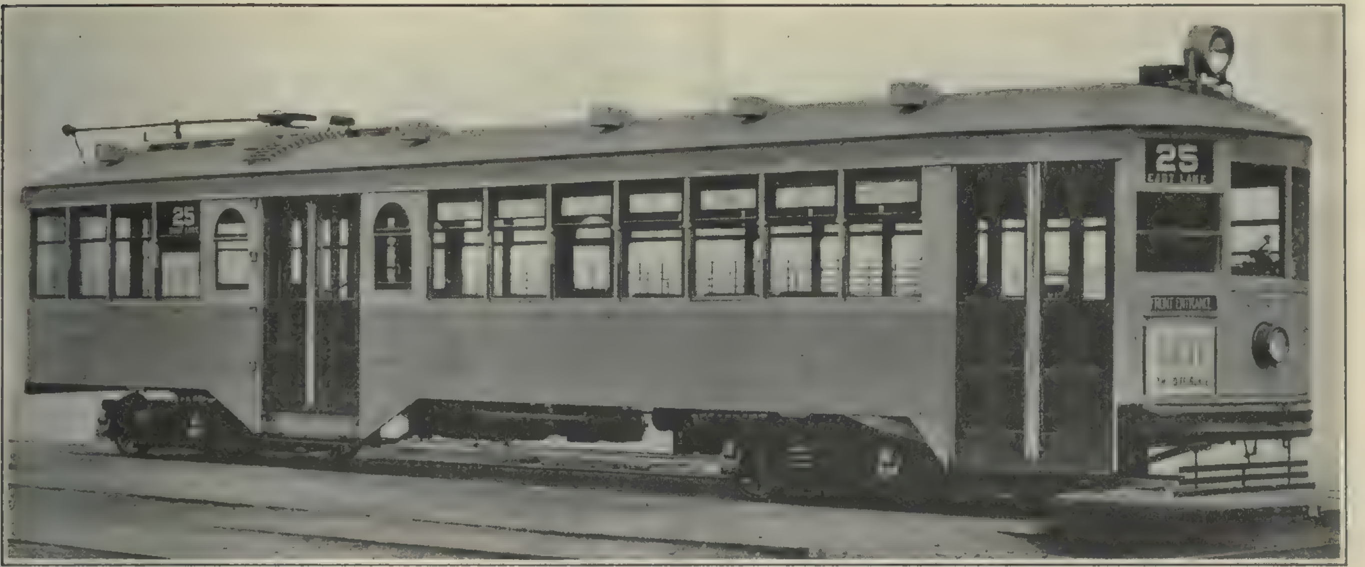
All spaces that are applicable to "Work Run" should contain figures or dashes. The dash is preferable to other marks, since if these latter are poorly executed they may be taken for figures, and so result in errors.

A Correction

In the issue of the JOURNAL for Nov. 25, 1926, page 957, in the article giving statistics on freight container shipments between Boston and Worcester, the figures were given in "tons." They should have been specified in pounds.

Birmingham Pleased with Its New Cars

Careful Attention to Local Requirements Was Given in Designing the Sixteen Units Recently Delivered—The Cars Are Truly "All Dressed Up," but They Do Not Lack for a Place to Go—Noise Reduction and Interior Decoration Are Important Features

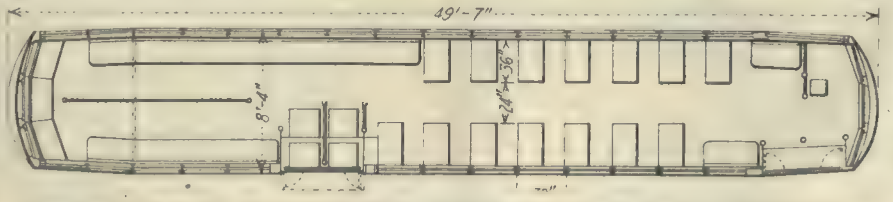


One of the Sixteen New Cars Which the Birmingham Company Has Purchased to Improve Further the Quality of Its Transportation Service

WITH a desire to eliminate noise to as great an extent as possible in the sixteen new cars recently delivered to the Birmingham Electric Company, Birmingham, Ala., all trapdoors have been omitted from the floor and oiling and inspection will be done from underneath. As a further step in attaining the desired end helical gears have been used and the bolsters are filled with ground cork and cement. Where they connect at the side with the framing of the cars the bolsters are insulated with ½-in. linoleum, securely fastened between the end of the bolster and the side sill.

Making it imperative for oiling and inspection to be carried on from without serves a further purpose than simply reducing the amount of truck noise which reaches the passengers. It effectively keeps the inspectors from entering the cars and soiling the plush seats and other features of the interior fittings through contact with their clothing and persons.

The sixteen cars just delivered are similar in general design and over-all dimensions to the standard single-end, double-truck, center-exit units which have been in service in Birmingham heretofore. They possess, however, a number of refinements in detail and in various features of appearance and comfort which will recommend them to the attention of railway men. Built by the Cincinnati Car Company, no effort has been spared in incorporating into the design all practicable ideas which will enhance the selling appeal of the transportation units.



Seating Plan of the Birmingham Cars, Showing the Arrangement of Longitudinal and Cross Seats Which Will Accommodate 60 Passengers

For example, there is the matter of the partition which has been erected at the front of the car just in the rear of the motorman's seat. It was desired to eliminate the unsightly appearance which it was felt the motorman's stool and curtain generally give. But on the other hand the designers wished to avoid having a plain and unadorned steel partition to confront the passengers, so a 24-in. x 26-in. beveled plate mirror was installed.

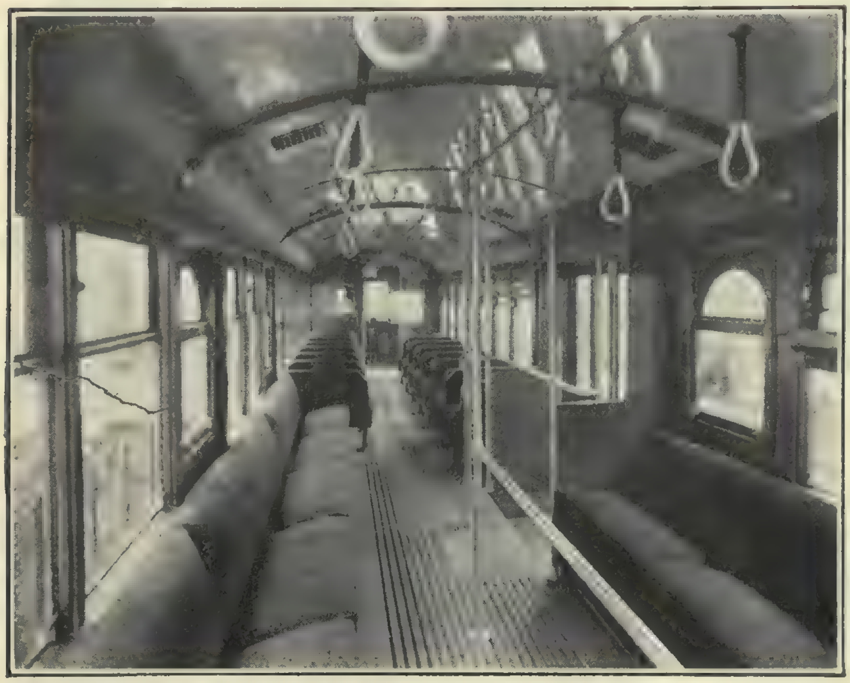
The seating arrangement consists of fourteen cross seats and additional longitudinal seats at the rear of the car. These latter, together with the row of seats extending across the extreme rear, will accommodate 32 passengers, making the total seating capacity 60. Before these new cars were placed in service fixed partitions had been used to separate the colored passengers from the white. In these units, however, this arrangement has been modified so that the amount of space set aside for colored passengers may be varied at will. This eliminates the necessity for white passengers having to stand while seats remain unoccupied in the colored section.

The new plan embodies the use of aluminum pipe stanchions and rails which may be adjusted as desired. Much pleasure has been evinced by patrons of the company due to the adoption of this more flexible arrangement. At the center of the side exit door there is another pipe stanchion which carries a lever for operating the center doors when two-man operation of the car is in effect.

A harmonious interior appearance has been effected through the use of first quality, green, unclipped Pullman plush in upholstering the seats along with silk window shades which match them in color. Cherry finish has been used throughout, with the steel stippled to match where exposed to view. Brass sash have been used to provide a pleasing contrast with the window shades and interior trim, as well as to facilitate the raising and lowering of the windows. The seats throughout are of the deep spring type, and a further element in passenger comfort was effected in increasing the seat spacing from 29 in. to 32 in. The floor under the seats is covered with ¼-in. rubber tile, while the aisles and platforms are covered with 1½-in. oak mat strips fitted with brass channels between. The edges of the rubber tiling at the aisles are finished with brass angles. Interior lighting is accomplished with flush porcelain sockets set into the headlining, using 46-watt frosted lamps.

The exterior finish of the cars is Duco, except for the upper wood sash and doors. The side panels and letterboard are finished in delft blue, while the side posts, front dash and posts are painted in cream. The top sash and doors are finished in cherry and varnished. All lettering and striping are in gold.

One-man operation is entirely feasible with these cars. With a single operator the side exit doors are treadle operated, or, as stated before, they may be manually controlled by the conductor when two men constitute the crew. Complete safety car devices are used, the brakes and line breaker being interlocked with the doors so that the car cannot start with the door open. Both front doors are connected with a selective valve under the control of the motorman. The electrical equipment of the car consists of four 35-hp. motors, a K-35 KK controller and a line breaker.



In the Foreground Is the Aluminum Rail Which May Be Adjusted to Vary the Amount of Space Reserved for Colored Passengers

Directly Behind Exit Sign May Be Seen Steel Partition Which Shuts Off Motorman's Compartment from Passenger View

Placing these new units in city service in Birmingham has marked another step in the avowed program of the local company to raise its transportation service to the highest possible plane consistent with earning capacity. That the townspeople appreciate the efforts of the railway is clearly indicated in the quantities of written and verbal praise and congratulations which have been received.

SOME OF THE PRINCIPAL SPECIFICATIONS FOR BIRMINGHAM'S NEW CARS

Seating capacity	60
Weight:	
Car body	17,380 lb.
Trucks	9,300 lb.
Equipment	8,340 lb.
Total	35,020 lb.
Bolster centers, length	29 ft. 3⅜ in.
Length over all	49 ft. 7 in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 4 in.
Height, rail to trolley base	10 ft. 8$\frac{11}{16}$ in.
Body	Semi-steel
Interior trim	Cherry finish
Headlining	¼-in. Agasote
Roof	Arch
Air brakes	Westinghouse
Armature bearings	Sleeve
Axles	Pollak Steel Company
Bumpers	Cincinnati, pressed steel
Car signal system	Faraday buzzer
Car trimmings	Dayton Manufacturing Company
Center and side bearings	Cincinnati
Compressors	Westinghouse DH-16
Conduits and junction boxes	Flexible duct
Control	GE K-35-KK
Curtain fixtures	Curtain Supply Company No. 90
Curtain material	Pantasote
Destination signs, Hunter illuminated 129 LR	
Door-operating mechanism	National Pneumatic
Fenders	H-B life guards
Finish	Duco
Gears and pinions	GE ratio 69-14
Hand brakes	Cincinnati 16-in. vertical wheel
Heater equipment	Consolidated Car Heating
Headlights	Electric Service Supply "Golden Glow"
Journal bearings	Sleeve
Journal boxes	Cincinnati Car Company Symington lids
Lightning arresters	GE aluminum cell
Motors	Four GE 265-A, 35 hp. inside hung
Registers	International No. 5
Safety devices	Safety Car Devices Company
Sanders	O. B. with No. 10038 traps
Sash fixtures	Dayton Manufacturing Company
Seats	Hale-Kilburn No. 208
Seating material	Chase Company "Friezette"
Slack adjuster	Cincinnati Car Company turnbuckle type
Springs	Union Spring & Manufacturing Company
Step treads	Feralun
Trolley catchers	O. B. No. 13141
Trolley base	U. S. 20-A
Trucks	Cincinnati Car Co. arch bar
Ventilators	Railway Utility exhaust, Cincinnati Car Company hatch type intake
Wheels	Southern Wheel Company 26 in., chilled iron
Special devices, etc.	Triple step treadle doors at both center doors

Storage Battery Locomotive Hauling Train at Wilson Terminal, Prague

Electric Railways of Czechoslovakia

The Largest City System Is at Prague, Where 500 Motor Cars and 450 Trail Cars Form the Equipment—There Are Also Interurban Lines in Czechoslovakia and Considerable Heavy Electrification Is Under Way

By Dr. F. Niethammer
Prague, Czechoslovakia

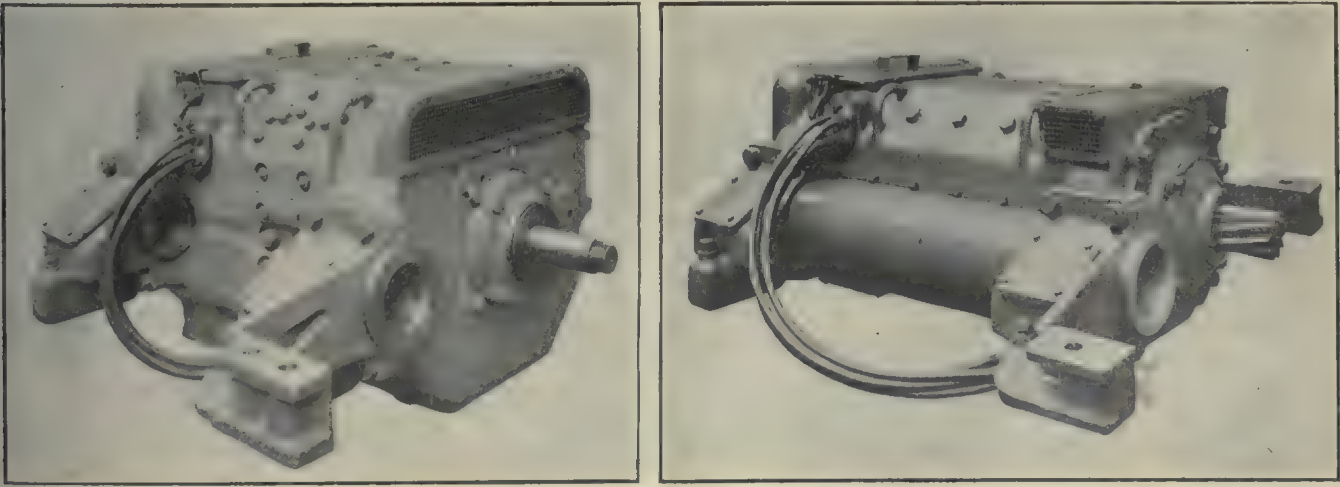
CZECHOSLOVAKIA has 256 km. (160 miles) of routes of city electric railways and 173 km. (109 miles) of interurban electric railway lines, according to recent statistics compiled by Ministerialrat Juranek. The largest system is at Prague, the capital of the country and a city of about 730,000 inhabitants. The track mileage in Prague amounts to 186 km. (116 miles), most of the routes being double track, and there are more than 500 motor cars and about 450 trail cars.

There are also a number of motor bus lines which are operated in supplementary service with the electric railways.

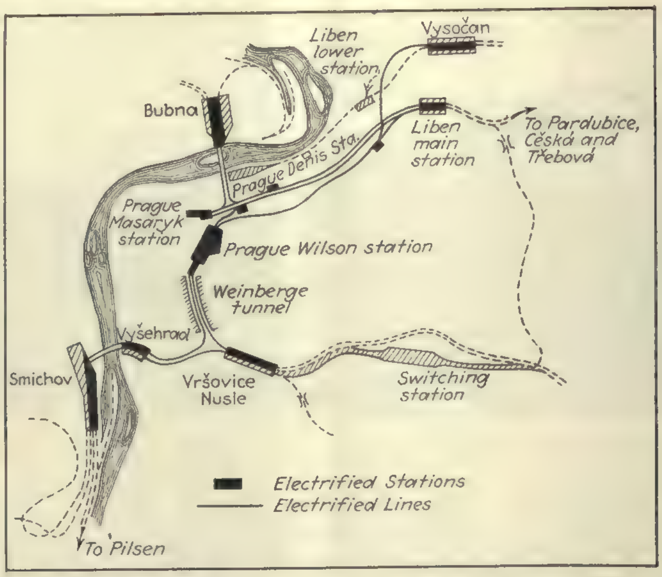
In 1925 the Prague Street Railway carried 173,400,000 passengers and operated more than 20,300,000 motor car kilometers and 11,100,000 trail car kilometers (12,700,000 motor-car miles and 6,937,500 trail-car miles). The receipts amounted to about $4,600,000, of which the operating expenses consumed 91 per cent. Power is taken from the municipal lighting and power system.

Although the lines in Prague have many curves and steep grades, some very good traffic records have been made. Thus, during the recent gymnastic festival, July 3 to July 6, 1926, more than 1,000,000 passengers were carried on the day of greatest traffic. The usual average on the Prague system is about 440,000. For this special festival 100 new motor cars and 100 new trail cars were purchased, some additional track was built and special schedules and routes were adopted to facilitate the transportation of people to and from the Stadium, or place where the gymnastic exercises were held.

At this point trains containing 200 passengers or more were dispatched at intervals of from sixteen to nineteen seconds, although the grades at this point are as high as 6 per cent. The number of night tickets sold on one of the days was 40,000, although night



At Left, Standard 40-Kw. Motor of Prague Street Railways. At Right, Standard 25-Kw. Motor of Brünn Street Railways tickets command an extra rate in Prague and the usual number of such tickets issued daily is only 5,000. The daily energy consumption during this period reached a maximum of 140,000 kw.-hr.



Map Showing Terminal Electrification at Prague

The motors used on the cars in Prague, as well as in Brünn, the next largest city in Czechoslovakia and the capital of Moravia, were supplied by the Skoda Works at Pilsen. In the accompanying illustrations views are shown of the latest motors as well as of the latest form of controller, which is of the camshaft type with mechanically operated contactors. The overhead construction is of the usual form for trolley wheel use and not for the bow type of trolley, as in many cities in central Europe.

Other cities in Czechoslovakia besides Prague and Brünn, which have standard gage street railways, are Kaschau, Olmütz and Pilsen. There are narrow gage street railway lines in Oderberg, Pressburg, Budweis, Gablonz, Iglan, Richenberg, Marienbad, Brüx, Troppau, Teplitz and Aussig.

INTERURBAN LINES

The three largest interurban electric railways in Czechoslovakia are as follows:

1. Tabor-Bechyne, 31 km. (20 miles) in length, in Bohemia. Tabor is on the direct railway line between Prague and Vienna.
2. The Tatra interurban system, 36 km. (23 miles) in length, in northern Slovakia.
3. Zartlesdorf-Lippen Railway, 28 km. (17 miles) in length, in south Bohemia.

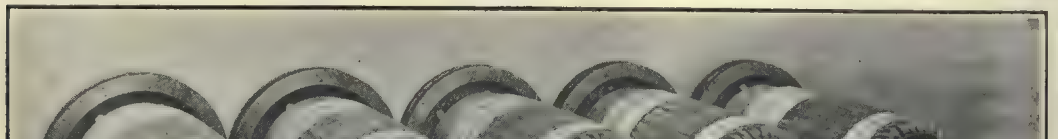
The first mentioned, a standard-gage line, was built by the Krizik Electric Company of Prague and has been in operation since 1903. An interesting feature is the system of power distribution, which is of a modified three-wire type. There are two overhead contact wires, one carrying 700 volts positive and the other 700 volts negative, with the rails as the neutral conductor. Each car is equipped with four 30-hp. motors permanently connected in two groups of two motors in series each, the middle point in each series group being grounded to the rail. The generators at the power station are wound to have an auxiliary set of brushes connected to the rail-ground, and in parallel with the generators is a storage battery also divided into two groups of cells with the connection between them joined to the neutral. Incidentally, it might be said, in 1905-06 the Krizik company built a 3,000-volt direct-current locomotive for Vienna on the same system; that is to say, with a difference of potential of 1,500 volts between each trolley wire and the ground. Each of the two driving axles of this locomotive was equipped with two 130-hp., 1,500-volt motors in series and connected to the driving axle by gearing.

The second interurban railway mentioned, the Tatra line, was built by the Siemens-Schuckert Works of Pressburg and the Ganz Company of Budapest. It operates through a region of splendid mountain scenery, with grades of more than 6 per cent. This line has the same system of distribution as that just described; that is to say, there are two overhead direct-current conductors, each with a difference of potential of 825 volts from the rails and of 1,650 volts difference between each other.

On one freight locomotive the motors are wound directly for 1,650 volts, but the motors on all of the other cars are wound for 825 volts.

The Zartlesdorf railway operates at 1,200 volts d.c. It was equipped by the Siemens-Schuckert Works in Vienna and has only four electric motor cars and a freight locomotive.

Of the three lines mentioned, the first is standard gage, the two others are narrow gage. There are several other smaller narrow gage lines in Czechoslovakia.



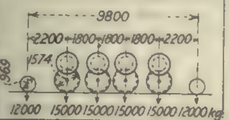
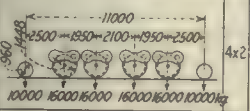
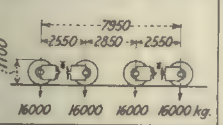
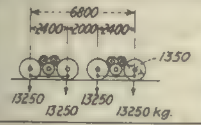
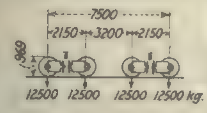
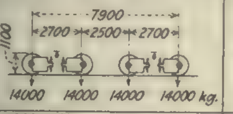
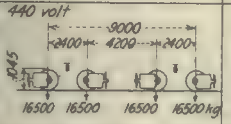
At Left, Row of Railway Motor Armatures. At Right, Camshaft Type of Controller. This Equipment Is Used in Prague

This list of interurban lines does not include the important Pressburg-Vienna electric railway as only a very short portion of it is in Czechoslovakia. The remainder of the trackage is in Austria.

MOUNTAIN RAILWAYS

In the Alpine sections, aerial cable lines for passenger service are beginning to replace rack railways and cable incline railways, as the aerial lines are much cheaper in first cost. Several of these aerial cable lines have been in operation for a long time near Bozen and Meran in the Southern Tyrol, and there are others in the Swiss and Austrian Alps. Two lines of this kind will soon be built in Czechoslovakia, one at Reichtenberg, the other at Johannesbad. The driving sheaves of these lines are operated by three-phase slip-ring motors, or by d.c. motors with Leonard control, and recuperation takes place when the down load is greater than the up load. Separate carrying and driving cables are used.

Data of Electric Locomotives of the Czechoslovakian State Railways

Locomotive	Contractors for Mechanical Part	Contractors for Electrical	Type	Number Ordered	Sketch of Locomotive	Number of Motors	Type of Motor	Gearing	Gear Ratio	One Hour Rating at Wheels in Hp	Weight in Kg. Adhesion (on Drivers)	Weight in Kg. Total	Control	Total Length over Buffers in mm.	Speed in Km:Hr. Normal	Speed in Km:Hr. Maximum
Passenger and Express	Breitfeld Daněk	Křižik-B.B.C.	1+AAAA+1	2	 9800 2200 1800 1800 1800 2200 1574 969 12000 15000 15000 15000 15000 12000 kg.	4	Interpoles, size poles Variable number of field turns	Buchli Gearing	1:3.205	Hp at 1350 volts 1460	60,000	84,000	Electropneumatic BBC camshaft controller	14,760	50	90
	Škoda Works	Škoda Works	1+AAAA+1	3	 11000 2500 1950 2100 1950 2500 1448 960 10000 16000 16000 16000 16000 10000 kg.	4x2	Interpoles and compensating winding	Quill Drive	1:3.68	1600	64,000	84,000	Electric driven camshaft controller	14,500	50	90
Freight	Českomoravská-Kolben	Českomoravská-Kolben	AA+AA	1	 7950 2550 2850 2550 1100 16000 16000 16000 16000 kg.	4	Interpoles, field shunting	Tramway suspension, Flexible axle wheel	20/59	1300	64,000	64,000	Electropneumatic Westinghouse control	11,870	50	[illegible]
				4					16/63						30	60
Switching	Škoda Works	Škoda Works	B+B	2	 6800 2400 2000 2400 1350 13250 13250 13250 13250 kg.	2x2	Interpoles and compensating winding	Quill Drive	1:6.066	800	53,000	53,000	Electropneumatic	10,200	30	50
	Adamsthal Works	Vickers (England)	AA+AA	2	 7500 2150 3200 2150 969 12500 12500 12500 12500 kg.	4	Interpoles	Tramway suspension	1:4.06	920	50,000	50,000	Electropneumatic camshaft controller	11,400	30	50
	Breitfeld Daněk	Siemens & Co	AA+AA	2	 7900 2700 2500 2700 1100 14000 14000 14000 14000 kg.	4	Interpoles	Tramway suspension	1:4.42	736	54,000	54,000	Electropneumatic contactors	11,300	30	50
	Breitfeld Daněk	Křižik El. Co.	AA+AA Storage Battery	1	 440 volt 9000 2400 4200 2400 1045 16500 16500 16500 16500 kg	4	Interpoles, field shunting	Tramway suspension	18:78	260	66,000	66,000	Mechanical drum controller	12,200	12	40
		Křižik El. Co.	A+A	1	Two Axles Two Motors per Axle	4	Interpoles	Tramway suspension	1	460	32,000	32,000	Mechanical drum controller	7844	30	–

INVESTMENT AND TRAFFIC STATISTICS

The total investment in the electric street and interurban lines in Czechoslovakia is estimated to be about $50,000,000 and the passenger traffic amounts to about 325,000,000 passengers yearly. There are about 7,000 employees, 900 motor cars and 700 trail cars. One-man cars are used on six of the smaller lines. Ten railways use track brakes.

RAILWAY ELECTRIFICATION

All main line railways in Czechoslovakia are the property of the government and since 1924 all electrified lines receive energy from the general three-phase, 50-cycle power transmission system in the country. In consequence of this standard, the high-voltage direct-current system has been adopted, most of the lines so far being built for 1,500 volts.

The most important electrification started is that at the Wilson terminal in Prague. This station is in the very heart of the city and with steam operation the emission of smoke from the locomotives was a great nuisance. In addition, the trains entering this station from the south had to pass through a long tunnel, so that the elimination of smoke-producing locomotives was very desirable.

The electrification of this new terminal was begun by the purchase of six storage battery locomotives to haul trains to and from the station through the tunnel and for a short distance beyond. One of these storage battery locomotives has been in regular service since May, 1926. It is the most powerful storage battery locomotive in Europe. It was built by the Krizik Electric Company and is illustrated in accompanying engravings. All principal data and details about it are given in the table. It operates from ten to twelve hours a day, hauling all important express and passenger trains in and out of the terminal and during this time uses only 300 kw.-hr. measured on the three-phase side of the motor charging set. It needs no boosting during its service time and is charged during three hours late at night. Its maximum energy consumption is 450 amp. at 450 volts.

There is one central cab for the locomotive engineer, who is the only operator required. A feature of the equipment is the drum controller with finger contacts which can be operated by either one of two hand wheels on a horizontal shaft, so that the driver can operate the controller from either side of the cab. Inside the control wheel is the handle of the starting switch for the electric pump of the vacuum brake. The main overload switch, the reversing switch, the battery changeover switch and the motor disconnecting switch are interlocked.

The battery equipment consists of 238 Tudor cells with an hourly rating of 392 amp.-hr. The four motors are 50 kw. each at 440 volts and 330 r.p.m. and have roller bearings, and motor braking is possible. The gear ratio is 1 to 5.118. The maximum motor efficiency, including gearing, is 88 per cent. The radius of action is 290 km. On a grade of 1.1 per cent and on a curve of 284 meters radius the locomotive has hauled a train of 400 metric tons at a speed of 5.5 km. per hour.

In the winter of 1925-26 sixteen electric locomotives for express, passenger, freight and switching service with overhead current distribution at 1,350-1,500 volts were ordered. Details about these locomotives are given in the accompanying table, together with those of the

Storage Battery Locomotive in Terminal Service in Prague

old Krizik locomotive from Vienna already mentioned, as this locomotive has now been adapted for Czechoslovakian service.

Individual axle drive is used exclusively, the motor suspension being usually of the tramway type, one exception being the switching locomotive of the Skoda Works (No. 4 in the table) which has two twin motors with gearing, crank and a horizontal connecting rod.

Most of the locomotives are mounted on double trucks with all axles motor driven. An exception is the first given in the table, which is of the solid frame type with pilot wheels. The second locomotive given in the table also has pilot wheels, so that all of the passenger locomotives are so equipped, but it is planned in the future to do without them and to use type C + C or B + B + B for the larger units which are built for speeds up to 110 km. per hour.

The maximum output per driving axle for the locomotive with tramway type of suspension for the motors is 400 hp., but for the quill or Buchli method of connection the output is as high as 1,000 hp. per driving axle.

In connection with the list of manufacturers, it should be said that the Krizik Electric Company has business relations with the Brown-Boveri Works at Baden and for stationary machinery with the Bergmann Works at Berlin, the Cesko-Moravska-Kolben has connections with the Westinghouse Electric & Manufacturing Company and the Skoda Works with Schneider Creusot of France, the Adamsthal Works near Brünn is in collaboration with the English Vickers Company and Siemens & Company are in close relation with the Siemens-Schuckert Company of Vienna and Berlin. It should also be stated that the AEG-Union Electric Company, which co-operates with the Allgemeine Elektrizitäts Gesellschaft of Berlin and the General Electric Company of Schenectady, received an order for the line equipment of the Wilson terminus.

It will be noted that some of the engines have twin motors and some motors have a compensating winding to neutralize the armature cross field and reduce the voltage between commutator bars. The field is weakened not only by shunting the field winding through a resistance, but also by changing the field turns in circuit. All the motor ratings given in the table are for the lowest trolley voltage of 1,350. All of the motors in the locomotives are of the ventilated type. The cushion or elastic type of gear is used on some of the locomotives.

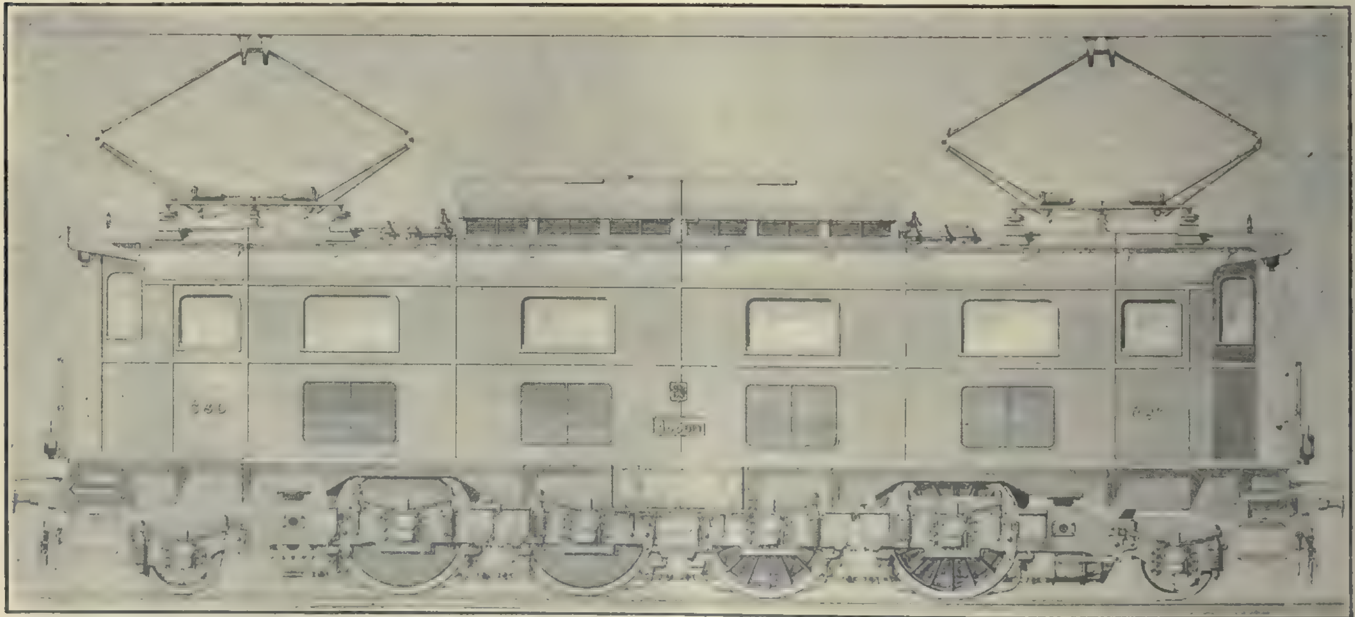
Contactor switches are employed on all the locomotives in connection with the control system but are not operated electromagnetically. They are equipped for operation either electropneumatically with single cylinders for each switch or by a camshaft, and this shaft is operated either electro-pneumatically or by an electric motor or by hand, as stated in one of the columns in the table.

LIGHT, HEAT AND BRAKE EQUIPMENT

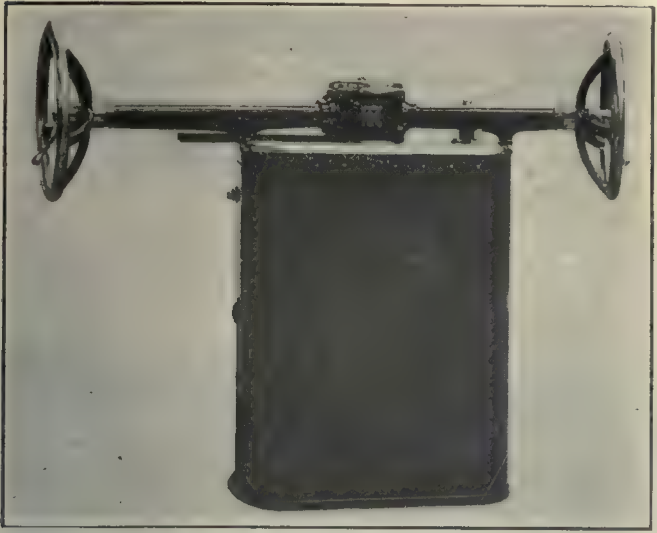
The light and control circuits are fed from a storage battery of two 24-volt units, but the heaters and all auxiliary motors for fans, compressors, etc., are supplied from the 1,500-volt trolley circuit. The cabs are heated electrically, but passenger cars are heated from a special steam boiler car. The whistle and sanders are operated pneumatically.

All locomotives are equipped with both air brakes and hand brakes, and the passenger and freight locomotives also have vacuum brakes. Every passenger and freight locomotive has two Westinghouse air operated pantograph collectors with two bows per collector. The contact pressure used is from 10 to 12 kg. (22 to 26 lb.).

Catenary overhead construction is used, and in some



One of the Passenger Electric Locomotives Being Built for the Prague Electrification. It Has Four Twin Type Motor Sets, one for Each Driving Axle



Controller for Storage Battery Locomotive

sections there are counterbalances to keep the trolley wire taut. The distance between the supporting poles is from 50 to 90 m. (165 to 275 ft.). Over each track there are two contact wires of 100 sq.mm. area (about 200,000 circ.mils). The messenger cable is just half the size and is of bronze in the tunnels and steel elsewhere. The rail bonds are soldered and welded.

POWER DISTRIBUTION

The single substation for the electrified zones in Prague is near the terminal and contains one double rotary of 2,000 kw. and one of 1,000 kw., built to supply two circuits of 750 volts in series. The rotaries have only shunt excitation, and a quick-acting circuit breaker is inserted in both direct-current lines. Future substations will be equipped with rotaries producing directly 1,500 volts in single machines and with mercury arc rectifiers. Power is received at the substation at 22,000 volts, three phase, from the local central station.

FUTURE PROGRAM

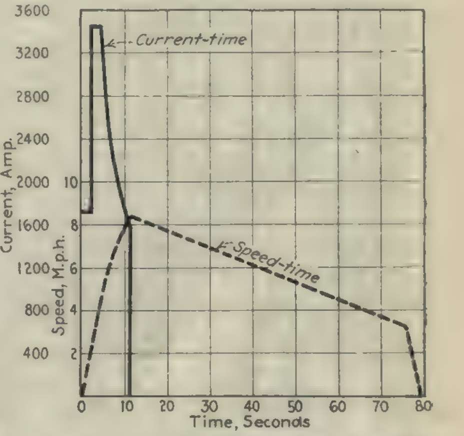
It is expected that complete electric service at the Wilson Station will begin in 1927. Later plans include the electrification of several suburban lines with motor cars, which will use the main line tracks for their suburban runs and the street railway tracks for city distribution in Prague. It is expected also to extend the trunk line electrification from Prague to Pilsen on the west and Trebova on the east.

Largest Storage Battery Locomotive Demonstrated

Before Many Witnesses the New 118-Ton Unit, Designed as an Intermediate Step in Electrification, Performs Switching Service in Competition with 127-Ton M-1 Steam Locomotive

WITNESSED by 100 representatives of railroads and manufacturers, the new storage-battery locomotive built for the Chicago & Northwestern Railway demonstrated in a satisfactory manner its ability to perform in competition with the M-1 type of steam switcher. The electric engine was designed to replace the M-1 type and several tests were made on Nov. 18 to demonstrate the relative operating characteristics of each.

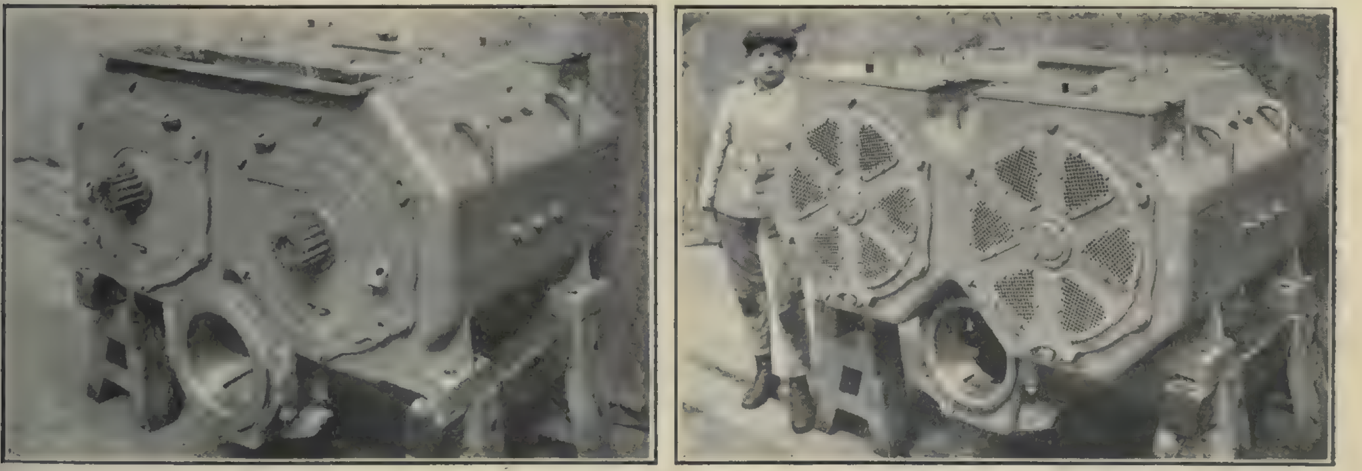
The first test was to determine the time required to move a given train 100 ft. from a standing start on a level tangent track with no slack in the train. The M-1 type of steam engine could not start the 1,700-ton test train assembled for this purpose without taking slack. The storage battery engine required 37.8 seconds to cover this distance under the conditions prescribed. Later the new unit demonstrated its ability to "kick off" fifteen cars, or 1,160 tons, over the hump and into the lead in 14.5 minutes. No comparative test of the steam engine was made.



Speed Time Curve for New Chicago & Northwestern Storage Battery Locomotive, Performing an Average Switching Movement as Determined by the Chicago Smoke Abatement Report. Trailing Train Weighs 306 Tons, Average Speed 5.4 M.P.H., Average Run 0.119 Mile, Per Cent of Time in Motion 60.1.

Of spectacular interest was the "tug of war" between the M-1 and the storage-battery engine, in which the latter won in both of the two trials made.

This new type of engine is dependent primarily on central station power for charging and hence was of direct interest to light and power officials. The tests



At Left Pinion End and at Right Commutator End of 425-Hp., 1,500-Volt Locomotive Twin Motor

were run coincident with a meeting in Chicago of the electrification committee of the National Electric Light Association, of which Britton I. Budd is chairman. Mr. Budd and many other members of this committee were present.

Railroad Officials Watching the Largest Storage Battery Locomotive Start a 1,700-Ton Train Without Taking Slack and Move 100 Ft. in 37.8 Seconds. The M-1 Type Steam Switcher Which This New Unit Is Designed to Replace Could Not Start the Same Train. This Unit Is Now Performing Switching Service in Chicago for the Chicago & Northwestern Railway

In all, seventeen railroads were represented by one or more delegates, as well as several associations. Many individuals interested in electric transportation were present, including Dr. Herman Bundeson, commissioner of health city of Chicago, who is most interested in this step toward electrification from the smoke abatement standpoint. Representing the Chicago & Northwestern were H. T. Bentley, general superintendent; S. W. Hand, assistant to the president, and H. M. Eicholtz, assistant general manager.

Primarily, this type of locomotive is only a step toward full electrification. It is intended to perform switching service in big cities in which smoke, gases and noise have become a serious detriment to surrounding residences and business establishments. The present unit has a 200-hp. gasoline-electric "kicker" to give the battery a partial charge when the required full day's performance would exceed the battery charge. Under severe service the normal battery charge can be used up in a few hours, or under light switching service it will last sixteen hours. Normally the engine should be out of service eight hours a day for complete charging.

A second logical step toward electrification would be to erect a short stretch of trolley over the track most frequently used and by means of a pantograph and a high-speed motor-generator on the locomotive the battery could receive frequent short charges. The trolley would be permanently connected to a power source suitable for driving the motor-generator. In this way the gas-electric set could be eliminated.

The M-1 weighs 126.83 tons complete with 60 tons on drivers, while the electric weighs 118.5 tons with all weight on drivers. The electric is 52 ft. long over couplers, 10 ft. 3 in. wide over rail guards and 14 ft. 6½ in. high. Two trucks are used with four GE-287 motors wound to operate at 225 volts each. Gear ratio is 66/13 on 39-in. wheels. The locomotive was constructed by the General Electric Company at the Erie works and made the trip from Erie to Chicago under its own power. A stop was made at Cleveland, where the engine was placed on exhibit during the last A.E.R.A. convention.

Electric Storage Battery Company's type FL-31 Ironclad, 120-cell battery is used. It weighs approximately 78,960 lb. and has a 2,700-amp.-hour discharge capacity at the six-hour rate. The maximum discharge rate is 6,500 amp.

The locomotive will haul a 2,000-ton train, including the locomotive, on level tangent track at a maximum speed of 12.7 m.p.h. and will haul this train 15.8 miles on one complete discharge of the battery.

When hauling a 333-ton train (total weight) at 20 m.p.h. the cost of energy per mile, using the battery alone, is 7.5 cents, assuming an "off-peak" charging schedule of 1 cent per kilowatt-hour.

The smoke abatement report of Chicago shows that the average switching duty for the engines in all Chicago yards requires a speed of 5.4 m.p.h., a total distance traveled per eight-hour day of 26 miles, requiring a coal consumption of 0.37 tons per hour. The average weight of switching train is 425 tons and the average length of run 628 ft. It is for this service that the storage-battery locomotive was designed.

Increased Demand for Automotive Service Equipment

Purchases in 1926 Were the Largest of Any Year of Record—Many Trucks for Miscellaneous Haulage Purposes Were Ordered

FLEXIBILITY of automotive service equipment is proving popular with electric railways. Automotive vehicles are replacing many of the electric cars previously used for carrying material from place to place. It has a particular advantage in that it can reach distant points by direct route, and does not have to follow the track. For wreckage purposes, its flexibility enables it to reach the point of trouble quickly and without waiting for the clearing of long lines of stalled electric cars.

In an accompanying table the automotive service equipment which was ordered by electric railways during the year 1926 is listed. An interesting feature of these figures is the large number of automotive trucks purchased for miscellaneous uses such as for removal of snow and transportation of freight and express. Many railways are finding these trucks of particular convenience in following up electrically equipped sweepers and snow plows which clean the track area. By the use of automotive equipment areas adjacent to the track are cleared quickly and congestion of traffic on the tracks is prevented. A number of railways also have contracts with city governments for the removal of snow adjacent to the car tracks and for this work the automotive equipment is found of particular value.

A general summary of the various types of equipment which are shown in the table, together with the comparisons of equipment ordered in previous years, appeared in the Jan. 1 issue of this paper. Lack of space prevented the publication of this table in that issue. The list includes 52 railway companies which ordered a total of 347 automotive service vehicles during the year just ended. This is an increase of approximately 25 per cent over purchases made in the preceding year.

Automotive Service Equipment Ordered by Railways During 1926

Name of Railway	No.	Type	Capacity, Tons	Make
Connecticut				
Connecticut Co..........	2	Frt. & Exp. Truck	1½	Reo
	1	Frt. & Exp. Truck	3½	White
	2	Service Truck	2½	Mack
	1	Tower Truck	2½	White
	1	Dump Truck	1½	Ford
	1	Snow Plow	1	Reo Signal
	1	Snow Plow	1½	Reo Tower
	2	Snow Plow	¾	Ford Service
	3	Snow Plow	....	Good Roads Mach.
Massachusetts				
Boston Elevated Ry......	77	Truck and Tractor	....	....
	18	Truck and Tractor	....	....
Eastern Mass. St. Ry......	7	Tractor	5	....
Middlesex & Boston St. Ry.	1	Truck	1	Graham
Union Street Ry.........	1	Tower Truck	2½	Auto Car-U. S. Ry.
Worcester Cons. St. Ry...	1	Truck	1	Federal
Maryland				
Cumberland & Westernport Electric Ry............	1	Frt. & Exp. Truck	3½	White
New Jersey				
Morris County Traction Co.	1	Snow Plow	....	Walter
New York				
Brooklyn City R.R........	21	Various	¾–5	White & Ford
Brooklyn-Manhattan Transit Corp...........	20	Truck	Var.	G. M. C.
Buffalo & Erie Ry........	4	Frt. & Exp. Truck	14½	White-Niagara
	6	Trailers	....	....
Newburgh Pub. Serv. Corp.	1	....	5	....
New York State Rys. (Rochester)............	1	Express Truck	1½	Graham-N.Y.S. Rys.
	1	Line Truck	1	Reo-N.Y.S. Rys.
	1	Service Car	1	Studebaker-N.Y.S. Rys.
	1	Money Wagon	1	Brockway-N.Y.S. Rys.
N. Y. State Rys. (Syracuse)	1	Express Truck	3½	Sanford-N.Y.S. Rys.
	1	Tractor	5	G. M. C.
	2	Trailers	2½	Wolverine
	1	Service Truck	1	Reo-N.Y.S. Rys.
N. Y. State Rys. (Utica)...	2	Express Truck	5	White-N.Y.S. Rys.
	1	Express Truck	1½	Brockway-N.Y.S. Rys.
	1	Express Truck	1½	G.M.C.-N.Y.S. Rys.
	1	Service Car	1	Reo N.Y.S. Rys.
Richmond Light & R.R. Co.	1	Tower Truck	....	Auto Truck
Third Avenue Ry.........	1	Truck	....	Reo
United Traction Co........	2	Tank Trucks	2½	Mack-Sharpsville
	2	Snow Plows	5	Walter
	1	Service Truck	1	Ford
Pennsylvania				
Altoona & Logan Valley Electric Ry............	1	Truck	2½	Mack
Erie Rys.	2	Dump Trucks	1½	....
Lewistown & Reedsville Electric Ry............	1	Truck	2½	Yellow
Philadelphia & West Chester Traction Co....	1	Service Truck	¾	Dodge
	1	Snow Plow	7	Walter
West Penn Rys...........	1	Tower Truck	2½	White
Illinois				
Aurora, Elgin & Fox River Electric Co............	1	Truck	1	Reo
Chicago & Joliet Elec. Ry..	2	Truck	2½	Garford
Chicago, North Shore & Milwaukee R.R........	22	Trailers	8	Mobile-Cincinnati
Chicago Rapid Transit Co.	1	Truck	¾	Ford
Chicago Surface Lines....	1	Frt. & Exp. Truck	....	Ford-DeKalbe
	2	Frt. & Exp. Truck	3½	White-Wayman & Murphy
	6	Service Trucks	3½	White-C.S.L.
	1	Service Truck	2½	Mack-Press Sons
	1	Service Truck	3	Auto Car
Indiana				
So. Indiana Gas & Elec. Co.	1	Service Truck	1	Graham
Iowa				
Sioux City Service Co.....	1	Truck	1	Ford
Kentucky				
Louisville Ry............	3	Service Truck	3	Ford
	1	Service Truck	1½	Graham
Michigan				
Dept. of St. Rys., Detroit..	5	Service Truck	....	Ford
	1	Truck	....	Cummings
	6	Truck	....	Walter
Minnesota				
Twin City Rapid Trans. Co.	2	Truck	1	Ford
Missouri				
United Rys. of St. Louis..	2	Tractors	....	Fordson
	1	Truck	1	Ford
	1	Truck	2	White
	2	Tower Truck	2½	White-U.R.
Ohio				
Community Traction Co..	1	Tower Truck	1	Inter.-McArdle
Pennsylvania-Ohio El. Co..	1	Truck	2½	White
	1	Truck	2½	Mack
Toledo, Bowling Green & Southern Traction Co...	2	Truck	1	Ford
Alabama				
Birmingham Electric Co..	3	Truck	5½	White-B.E. Co.
	1	Truck	5½	Ford
Florida				
Miami Beach Ry.........	1	Truck	¾	Graham
Georgia				
Macon Ry. & Light Co....	1	Tower Truck	2	White-McCardle
California				
Key System Transit Co....	18	Trucks	....	Various Kinds
Market Street Ry.........	1	Frt. & Exp. Truck	3½	Fageol
Municipal Ry. of San Francisco..............	1	Dump Truck	5	White
Pacific Electric Ry.......	1	Service Truck	1	Graham
Nebraska				
Omaha & Council Bluffs Street Ry.............	1	Truck...........	1	Ford
Texas				
Dallas Ry. & Terminal Co.	1	Truck	....	Chevrolet
	1	Truck	....	Ford
El Paso Electric Co......	1	Truck	1	Ford-E. P. E. Co.
Washington				
Puget Sound Pwr. & Lt. Co.	2	Truck	1	Graham
	1	Truck	1½	G.M.C.-P.S.P. & L. Co
	1	Truck	1½	Garford-P.S.P. & L. Co
Seattle Municipal Ry.....	1	Money Truck	1	Graham
Canada				
British Columbia Elec. Co.	2	Frt. & Exp. Truck	3	Federal-B. C. E. Co.
	3	Frt. & Exp. Truck	2	Federal-B.C.E. Co.
	2	Frt. & Exp. Trailer	4	Dominion-B.C.E. Co.
	3	Truck	2	Federal-B.C.E. Co.
	6	Service Car	¾	Ford-B.C.E. Co.
Hydro Electric Rys.......	1	Truck	....	Ford
Montreal Tramways......	6	Dump Truck	1	Ford-Hughes Keenan
	2	Express Truck	2½	Federal
	1	Express Truck	3	Leyland
	1	Tower Truck	2½	Federal
Toronto Transp. Com.	15	Truck	....	Ford
Total...............	347			

The Readers' Forum

Traffic Congestion Editorial Approved

NEW YORK, N. Y., Dec. 24, 1926.

To the Editor:

I wish to compliment the writer of the editorial on page 1079 of the Dec. 18 issue of ELECTRIC RAILWAY JOURNAL on the subject of "Traffic Congestion in New York City."

I should like to see some set-up effected by interested parties whereby this character of information would get a wider circulation and be placed in the hands of the riding public. T. R. LANGAN,
President Metropolitan Section A.E.R.A.

Foreman Conferences Can Help

BOSTON ELEVATED RAILWAY

BOSTON, Jan. 1, 1927.

To the Editor:

The editorials on educational activities in the steam and electric railway fields which appeared in recent issues of the ELECTRIC RAILWAY JOURNAL are timely and sound in their reasoning. Our experience has shown that men in supervisory positions; that is, foremen in a broad sense, are eager to discuss the principles of foremanship, and their interest increases after they see the possibilities of such discussion. Your statement regarding the continued enthusiasm of foremen in the steam-railroad field could be duplicated with respect to our own field and that of manufacturing.

It is probable that the average foreman has never had an opportunity to think of his duties in a broad way. He has come up from the ranks and presumably has been a skilled workman, using that term to cover all kinds of electric railway work. He has had difficulty in detaching himself from the point of view of the workman. When he has pointed out to him the possibilities of his supervisory work in seeing that what is supposed to be done is done right, in considering the element of cost, in insuring that each job under him is being done in the best possible way, in looking out for the welfare of his working force, in co-operating with the working force, his fellow foremen and the management, etc., he is amazed, delighted and stimulated to make the most of his opportunities. This explains, to my mind, the widespread interest in foreman conferences, and it is to be deplored that more executives do not appreciate the fallow field which lies right at their door.

You touch upon the subject of apprenticeship, which is more difficult to deal with. The old-fashioned apprenticeship system has largely died out and there is nothing yet to take its place. The manufacturing industries are possibly getting hold of this situation, but not on the old basis. The steam railroads seem to be making some progress too. The subject is one which ought to be discussed freely in our industry. I hope that your correspondents will take it up. In the meantime, little discussion is needed on foreman conference plans. The foremen everywhere will welcome these conferences. All that is needed is for some one on each property to give the matter careful study. The American Electric Railway Association committee on education, under the leadership of Edward Dana, through its series of "How-to-do-it" booklets has made its recommendations very definite. The demonstrations under the auspices of the committee, which you indorsed in your editorials, have shown how uniformly foremen from different properties, previously unacquainted with each other and with the foreman conference plan, react to these conferences. H. H. NORRIS,
Educational Adviser.

Long Electric Trains Not Unusual

NEW YORK, NEW HAVEN & HARTFORD RAILROAD

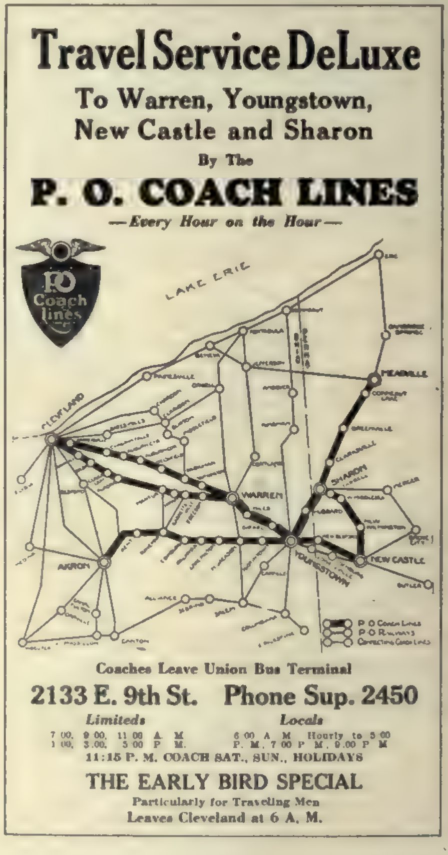
NEW HAVEN, CONN., Dec. 11, 1926.

To the Editor:

I noted with interest your account as published on page 568 of the JOURNAL for Oct. 2 of the test of the New York Central locomotive between Harmon and New York City, in which it was stated that the train of 108 freight cars was "the longest ever seen in New York City." I beg leave to call to your attention the fact that on the New Haven Railroad there are freight trains (electrically operated) relatively frequently of more than 100 cars and in numerous instances of more than 108 cars, these trains being hauled along the Harlem River branch to the Harlem River or Oak Point terminals. SIDNEY WITHINGTON,
Electrical Engineer.

Buses Extend and Augment Rail Lines

THIS advertisement of the Pennsylvania Coach Lines in recent issues of the *Official Cleveland Guide* shows not only the progressive leadership of this subsidiary of the Pennsylvania Ohio Electric Company but the wide extent of the service supplied. A few years ago the parent company operated only rail service to Youngstown and Warren, Sharon, Newcastle and intermediate points, with connections as shown.



Travel Service DeLuxe
To Warren, Youngstown, New Castle and Sharon
By The
P. O. COACH LINES
—Every Hour on the Hour—

Coaches Leave Union Bus Terminal
2133 E. 9th St. Phone Sup. 2450

Limiteds	*Locals*
7 00, 9 00, 11 00 A. M. 1 00, 3.00, 5 00 P. M.	6 00 A. M. Hourly to 5 00 P. M., 7 00 P. M., 9.00 P. M.

11:15 P. M. COACH SAT., SUN., HOLIDAYS

THE EARLY BIRD SPECIAL
Particularly for Traveling Men
Leaves Cleveland at 6 A. M.

Maintenance Notes

Pneumatic-Tired Truck for Moving Fenders

HANDLING and transporting fenders in and about the shop of the York Railways, York, Pa., was always a troublesome and expensive job until E. L. Greene, master mechanic, designed and constructed a pneumatic-tired hand truck to facilitate this work. This truck has a pair of Ford automobile wheels mounted on an axle to which is attached a 6-ft. by 3-ft. underslung rectangular oak frame of rugged construction. This is fitted with suitable saddles and rests to permit the safe, steady carrying of fenders in a vertical position.

Fender Loaded on Pneumatic-Tired Truck Ready for Transportation

Fenders are very unwieldy pieces of apparatus to handle and to transport them to and from various sections of the shop formerly required the services of two men and was necessarily rather slow. Since this truck has been placed in service one man has been able to load and transport fenders around the shop. This results in a reduction in fender labor maintenance and a tremendous increase in shop transportation speed.

Location of the Jumper Fuse

WHEN a piece of apparatus driven by an electric motor is used out on the line the power is generally taken from the trolley wire through a wire jumper with a hook on its end. The hook is attached to the end of a pole and is long enough to permit of being hooked over the trolley wire, or, better still, over an ear, because of the lessened liability of the wire being damaged by an arc.

The usual place for the fuse in such a circuit is at the motor, the idea being to protect the machinery. However, on the lines of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., after having had the trolley wire burned down on several occasions due to the insulation of the jumper wire becoming worn off and the wire grounding on the track, a fuse has been installed in the wire on the pole, where it is so close to the trolley wire that there is no chance for a ground occurring inside of its protection. This location is most satisfactory.

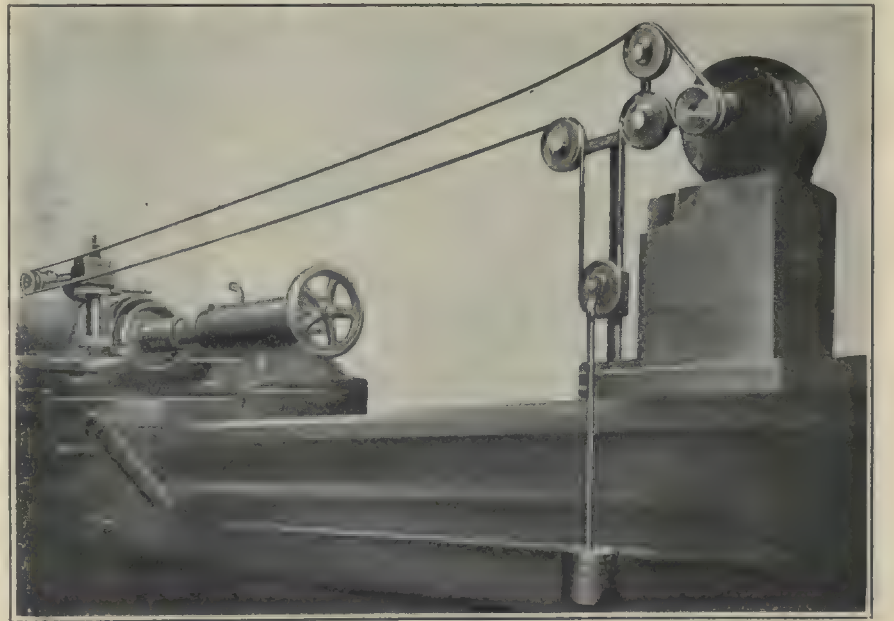
Railway operator's "three R's"—
Requisition, Reliable, Renewals.

Commutator Slotter on Lathe Tool Stand

FULLY appreciating the value of commutator slotting, and not being financially able to purchase a manufacturer's product, the Williamsport Passenger Railway, Williamsport, Pa., designed and built a slotting device in its shop. The equipment is designed to be used in connection with a lathe. It is of the semi-portable type, since the slotter proper can be set up readily on the lathe tool stand or removed at will. The motor, with a group of pulleys, is installed on a wood pedestal and is clamped and mounted permanently on the extreme right-hand end of the lathe rails.

A 1-in. steel tube is fastened to a steel plate on one end and to the saw shaft bearing casting on the other. Passing through tube, steel plate and bearing casting is a ¾-in. bolt used for fastening the machine to the tool stand. The saw shaft passes through suitable bearings. On its end is a 3-in. grooved pulley.

A ¼-hp., 110-volt universal motor drives the slotting machine by means of a ⅜-in. round belt guided and supported by 3-in. grooved pulleys, all of which are stationary except the counterweight wheel. The depth of the slot is controlled by the diameter of the saw being used, whereas the lateral motion is ob-



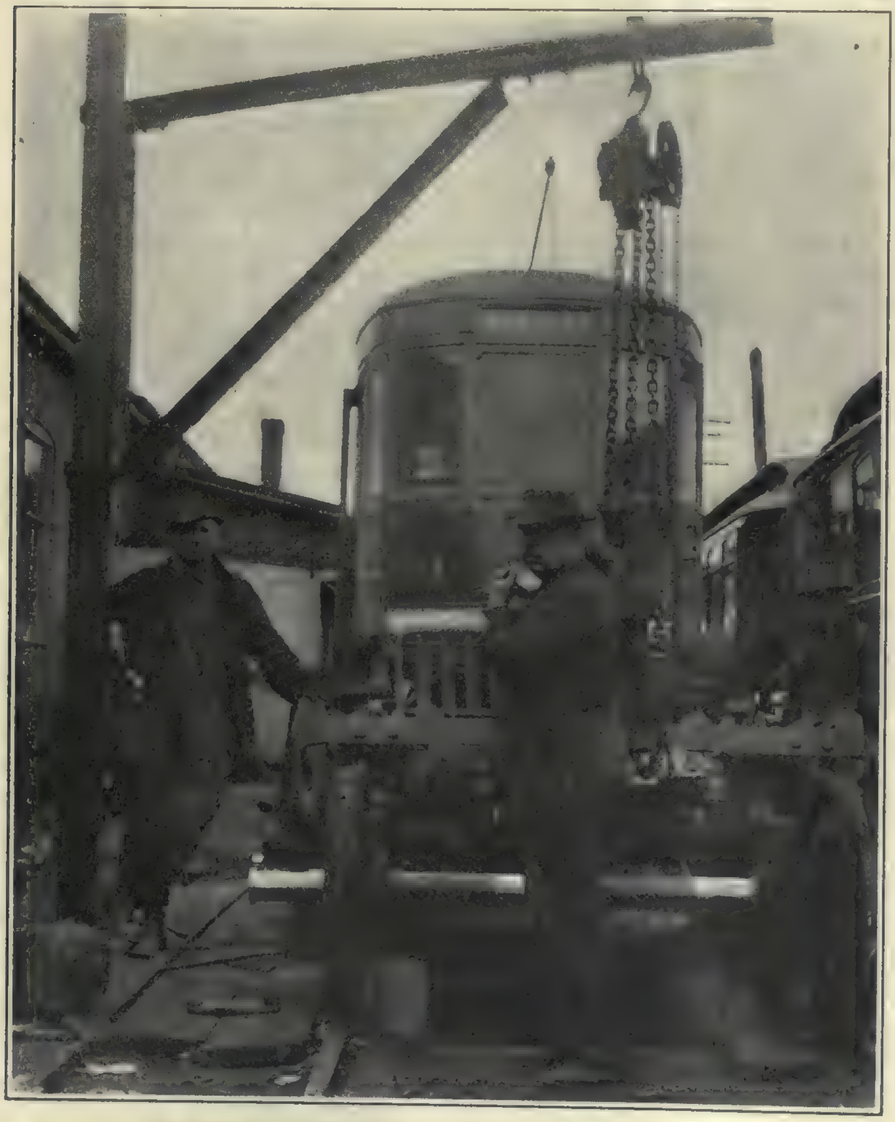
Slotting Equipment Installed in Position and Ready for Use tained by means of tool stand movement. The lengthening or shortening of the belt due to the tool stand travel is taken up by means of a counterweight attached to a 3-in. grooved pulley suspended over the lower part of the belt, held in place and guided in its oscillating vertical movement by a 1-in. T-iron bracket fastened to the motor foundation block. The other pulleys are rigidly supported and act as directional belt deflectors. This equipment has been giving satisfactory service for about two years.

> *"Keep up" with your schedules by systematic equipment "up keep."*

Derrick for Lifting Motors and Trucks

NECESSITY, as the mother of invention, has been very clearly demonstrated by the shop organization of the Valley Railways, Lemoyne, Pa. Due to limited shop space and track facilities, it was found impracticable to take care of painting, damaged car repairs and motor or truck overhauling at the same time. This interfered greatly with the usual maintenance procedures. Lifting facilities in the shop often were obstructed by work in progress. In order to reduce such interruptions a derrick was erected outside the shop building on an adjacent track. This derrick consists of an 8-in. iron pipe mast inserted in a concrete foundation, and a boom made of 65-lb. T-rail, reinforced by a T-rail diagonal brace and a 1-in. x 4-in. vertical brace of steel strap, all being bolted together rigidly. The upper end of the boom framing is provided with a guide ring and the lower end with a thrust ring, thus permitting a free circular movement and providing a substantial construction for the carrying of the load.

The thrust ring rests and revolves upon a heavy circular band welded to the mast, which when lubricated, enables the operator to change its position without any great physical effort. Lifting is accomplished by means of a chain hoist suspended from a strong movable link attached to the boom. This derrick has proved very satisfactory and has been a means of obtaining a non-interrupted motor and truck overhauling schedule.



Truck Frame Suspended on Outdoor Derrick Chain Hoist

Pick-Up and Delivery Service for Storeroom

PICK-UP and delivery service is given by the storeroom in the South Park shop of the Los Angeles Railway to all departments included in the shop area. This system replaces the former method of delivering goods on requisition and has resulted in saving a substantial amount of money. Instead of 200 shop men per day calling at the storeroom for materials needed, four delivery clerks make regular calls on the several departments of the shop five times per day. They collect requisitions for material from pick-up boxes and make delivery of material to the proper departments. In some cases one department will requisition material to be delivered to another department for use by its men while doing special work there.

Requisitions are made out in duplicate, the original being given to the storeroom boy and the carbon retained by the department foreman for allocation of charges on the job. When the errand boy is making delivery, which often requires the use of a truck or cart, he collects salvage and scrap materials, which are returned to the storeroom for reclaiming or other disposal.

This system has eliminated the long line of men waiting 20 to 30 minutes at the storeroom counter for service. With 200 men calling at the storeroom, this amounted to a considerable loss in labor time. It has been calculated that the new system has resulted in a saving of $15,000 a year.

Besides the saving in productive time, the entire department is speeded up because the materials needed are constantly available.

During the month of November 5,088 deliveries were made at an average of 4¾ minutes per delivery.

When material is delivered, the original requisition, which is returned with it, is signed by the foreman. It is returned and placed in a box in the storeroom as a receipt for the delivery, also serving to check material on hand in the stockroom and indicating the department to which general charge can be made. The foreman makes the detailed distribution of charges on his copy of the requisition.

Cover hints for ventilated motors—Porous knits or B.V.D.'s for summer, and red flannels when the snow flies.

New Equipment Available

Electric Tie Tamper Has Only One Moving Part

BY AN unusual application of magnets energized by alternating current, an electric tie tamper recently put on the market by the Syntron Company, Pittsburgh, Pa., is able to strike 1,200 blows per minute. It is claimed that this apparatus quadruples the amount of tamping that a track laborer can do in a day. During a test made by the Monongahela Railroad a 198-ft. section of track was electrically tamped in seven man-hours, while it required 26¼ hours to tamp a section of the same length by hand. The cost of electric tamping was 1.5 cents per foot of track, as compared with 5.3 cents per foot for hand tamping. Detailed figures for this and another similar test are given in an accompanying table.

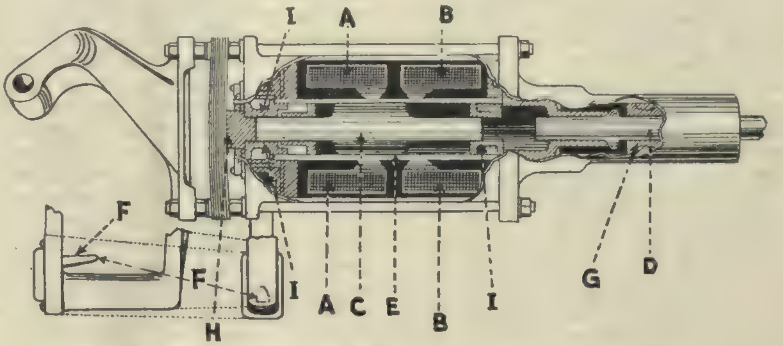
The Syntron electric tie tamper has only one moving part—the piston. Four powerful electromagnets are located in a cylindrical housing around the upper end of the piston. Energizing the magnets by alternating current gives the piston a reciprocating motion in synchronism with the supply voltage.

The tamping tool is held by a bushing so that it receives the full force of the blow as the piston reaches its maximum speed. On the backward stroke the piston impacts against a shock-absorbing device which takes up the kinetic energy of the movement and utilizes it to add force to the downward stroke. An accompanying sketch shows the arrangement of the various parts of the apparatus. The total weight is 56 lb.

Starting and stopping of the hammer is controlled by a trigger on the side of the handle. Current supply to the tamper is regulated through a small portable control box.

The alternating current required for operation of the apparatus is derived from a portable power plant consisting of a four-cylinder, 15-hp. Le Roi water-cooled gasoline engine direct connected to a 6-kva., 110-volt generator. Energy for the simultaneous operation of four tampers is supplied. The power plant weighs only 750 lb. and can be moved easily from place to place either by carrying or on dolly wheels.

Chief among the advantages claimed for this outfit are the rugged character of the tamper because it has only one moving part and the portability of the power plant because of its light weight.



Simplicity Is a Feature of the Syntron Electric Tie Tamper

A and *B*—Magnets.
C—Steel piston.
D—Tamping tool.
E—Cylindrical housing.
F—Control trigger.
G—Bushing.
H—Shock absorber.
I—Bushing.

The Power Plant of the Syntron Electric Tie Tamper Weighs so Little that It Can Be Carried by Hand from Place to Place. A Battery of Four Electric Tampers at Work

TEST OF ELECTRIC TAMPING VERSUS HAND TAMPING CONDUCTED ON MONONGAHELA RAILROAD AT POINT MARION, PA.

	Rails	Ties	Feet	Lift, Inches	Men	Hours Work	Hours Tamp	Total Hours Tamp	Total Cost Tamp	Gas and Oil	Total Opp. Cost	Cost Per Rail	Cost Per Tie	Cost Per Foot	Cost Per Mile
June 30, 1926															
Hand tamp	..	56	95	2	8	9	1¾	14	$5.60	....	$5.60	....	$0.10	$0.059	$311.52
Syntron tamp	..	95	175	2	6	9	1¾	10½	4.20	0.25	4.45	....	0.046	0.025	132.00
July 2, 1926															
Hand tamp	6	120	198	2	15	1¾	1¾	26¼	$10.50	....	$10.50	$1.75	$0.08¾	$0.053	$279.40
Syntron tamp	6	120	198	2	6	1⅙	1⅙	7	2.80	0.20	3.00	0.50	0.02½	0.015	79.20

Association News and Discussions

Midwestern Association Meets in Tulsa

MODERNIZATION of the interurban railway, public relations, improvement of transportation and the advantages of new equipment occupied the first day of the two-day session of the Midwest Electric Railway Association which was in session as this issue of the JOURNAL went to press.

After a cordial welcome to the city by Mayor H. F. Newblock of Tulsa, J. M. Bosenbury discussed in detail the methods by which the Illinois Traction System had succeeded in stopping a downward curve of passenger earnings and in building up a substantial increase in freight revenue. To improved equipment, increased speed and intense merchandising effort on the part of both the management and employees of the company was attributed the success accomplished.

The subject of public relations was handled from the angle of the public's own viewpoint by E. F. McKay, manager Oklahoma Utilities Association. Demonstrated sincerity of purpose was held by Mr. McKay to be the first principle in the establishment of a sound public relations policy. The speaker characterized the sense of his thought by pointing out that the establishment of good public relations, like good statesmanship, is dependent on successful diplomacy and that good diplomacy is merely good faith.

M. W. Welsh, manager Waterloo, Cedar Falls & Northern Railroad, representing the Iowa Electric Railway Association, addressed the meeting on the invitation of President Reynolds. He described the tendency of recent years for electric railways to adopt a defensive attitude instead of one of positive aggression. He maintained that the railways had not been given fair consideration, in some cases by their own managements, in comparing their performance with that of buses. "People like success," said Mr. Welsh, "and it is up to all of us to drop our tendency to whine about our troubles and concentrate on so improving our service as to win public interest and support."

In a paper which was declared by several of those in attendance to be one of the best ever delivered before a sectional association meeting R. N. Graham, manager railways Penn-Ohio Electric Company, Youngstown, Ohio, outlined the principles on which his company had so improved its condition as to win the Coffin Award for 1926. Mr. Graham's paper will be published in next week's issue.

A general survey of the industry, indicating that the railways of the country are expending in excess operating costs for obsolete equipment a sum sufficient to purchase 12,000 new cars per year at $15,000 each, was the basis for an address by Charles Gordon, indicating that the industry cannot afford longer to continue the operation of heavy and out-of-date cars. A further report of the meeting will be published next week.

Important Tentative American Standards Completed

WORK of the sectional committee of the American Engineering Standards Committee on tooth form of spur gears, which has been in progress for several years, has been completed and has been submitted for the formal approval of the A.E.S.C. as a tentative American standard. Several parts of the comprehensive work on bolt, nut and rivet proportions are now nearly completed, and the same is true of several sections of the work on pipe flanges and fittings. It is expected that the first of these to be issued will be that on high-pressure steel flanges, which, although not yet officially completed, is already practically the sole basis of industrial practice in recent advances in high-pressure steam practice.

The work on mechanical standards now in the course of development under A.E.S.C. procedure is so extensive that plans are under way for the organization of a representative advisory committee to keep the various parts of the work properly co-ordinated.

During the year 1926 specifications satisfactory to both the steam railways and electric railways have been agreed upon for the first time. It is an interesting illustration of the manifold inter-relationships of modern industry that eleven national organizations were officially represented on the sectional committee through which this unification of specifications has been accomplished. Specifications for tubular steel poles and for girder rails have also been unified and approved as tentative American standards.

Twenty of the 50 codes on the national safety code program have now been approved by the A.E.S.C. Among those receiving approval during 1926 were a group of codes for the prevention of dust explosions and new editions of the codes for abrasive wheels and punch presses.

A particularly important development has been the revision of the "National Electrical Code," which is the industry's bible for wiring devices. This included a settlement, by almost unanimous action, of a controversy of three years standing over the admission as approved material of non-metallic sheathed cable. This new material was approved for limited uses.

In connection with the safety code program, and upon the initiative of the state industrial commissions, arrangements have been made for a revision of the standard plan of reporting and compiling accident statistics under the procedure of the American Engineering Standards Committee. This plan forms the general basis of the accident statistics of the various state governments and of the casualty insurance companies.

COMING MEETINGS
OF
Electric Railway and Allied Associations

Jan. 10-11—National Automobile Chamber of Commerce, third world motor transport congress, Hotel Roosevelt, New York City.

Jan. 10-14—American Road Builders' Association, convention and road show, Coliseum, Chicago, Ill.

Jan. 18—American Society of Safety Engineers, annual meeting, Cafe Boulevard, New York City, 6:30 p.m.

Jan. 19-20—Central Electric Traffic Association, Fort Wayne, Ind.

Jan. 21-22—Central Electric Railway Accountants' Association, Fort Wayne, Ind.

Jan. 25—New York Electric Railway Association, winter meeting. Hotel Commodore, New York City.

Jan. 26-28—Association of Equipment Men — Southern Properties, Peabody Hotel, Memphis, Tenn.

Feb. 3-4—Central Electric Railway Association, winter meeting, Toledo, O., Commodore Perry Hotel.

Feb. 4—American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p.m.

Feb. 7-10—American Institute of Electrical Engineers, annual convention, Engineering Societies Building, New York City.

Feb. 10—Central Electric Railway Master Mechanics' Association, Toledo, Ohio.

Feb. 18-19—Kentucky Association of Public Utilities, annual convention, Brown Hotel, Louisville, Ky.

April 26-29—Southwestern Public Service Association, convention, New Orleans, La.

Oct. 3-7, 1927—American Electric Railway Association, annual convention, Public Auditorium, Cleveland, Ohio.

Third World Motor Congress

NATIONAL Automobile Chamber of Commerce will hold its third world motor congress Jan. 10 and 11 at the Hotel Roosevelt, New York City. Discussions of international development of motor transport, highways, trade practices, public relations and automotive finance will fill the major part of the program. Delegates will visit the National Automobile Show at the Grand Central Palace, Jan. 12, and will then go to Detroit and other Western cities to inspect factories of the industry.

The News of the Industry

Further Economies by Seattle Municipal Line

Economies which were to be put into effect on Jan. 3, including rerouting of cars, were expected to cut 40 men from the payroll of the Seattle Municipal Railway, Seattle, Wash., and reduce operating expenses an additional $146,420 annually. D. W. Henderson, superintendent, so declared in a statement to Mayor Bertha K. Landes. The rerouting is part of the proposed economy program of the railway. It will decrease the week-day car-hours 308 hours and twelve minutes a day and the Sunday car-hours 404 hours and 45 minutes. This, Mr. Henderson says, will result in a saving of $146,420 a year in platform time.

Meantime, the City Council has voted, eight to one, to repeal the ordinance enacted recently when the Seattle Clearing House Association refused to cash December payroll warrants of the railway, which provided for an increase from 2 to 2½ per cent interest on city funds. The banks refused to permit the advance and have refused city money at the new rate. The city's contracts with the banks expired on Dec. 31 and it was necessary to repeal the ordinance so that the city would not be faced with more than $5,000,000 of money on hand and no place to bank it.

Street railway employees, through their union leaders, have informed Mayor Bertha K. Landes that they will fight any attempt by the city to lay off street railway employees on the efficiency rating basis. They declare that if lay-offs be made, they must be according to seniority. The city charter provides that lay-offs be based on the efficiency rating schedules, which the union men state violates the union principle that men employed the shortest time be the first to be discharged.

Meantime, Mayor Landes will begin a series of conferences immediately after Jan. 1 with officials of the Puget Sound Power & Light Company in an effort to extend the time for payment of the Municipal Street Railway debt. In the opinion of city officials, one of the most pressing of the department's financial problems will be ironed out if an extended payment plan can be put into effect.

Final Hearing on Utica and Syracuse Fares

Chairman Prendergast held the final hearing in Albany on Jan. 5 on the petition of the New York State Railways to the Public Service Commission for permission to increase railway fares on its Syracuse lines.

Evidence was submitted by Charles Hansel as to reproduction cost and value of the property of the railway. Mr. Bean, the chief engineer of the company, and B. E. Tilton, vice-president and general manager of the Utica and Syracuse lines, were cross-examined by the attorney for the city. Mr. Tilton presented statements showing the result of operations on the Utica lines from Aug. 22 to Dec. 31 in the years 1925 and 1926, giving a comparison of the earnings in these two years, the effect of increased fares and the use of commutation tickets. He stated that the averages show that 27 per cent of the passengers are paying cash fares and 73 per cent buying tickets.

The engineers of the commission were cross-examined as to such inspections and their valuation of the property and equipment of the railway.

H. Duance Bruce, assistant corporation counsel, and Milo R. Maltbie, former Public Service Commissioner, represented the city of Syracuse. Willis H. Mitchell and W. G. Gannon of Gannon, Spencer, Mitchell & Riley, attorneys, represented the railway.

Counsel were given two weeks in which to file briefs. Mr. Prendergast stated that he would like to have the decision expedited as much as possible.

Inquiry Into Proposed Fare Changes in Newark

Proposed changes in eleven fare zones in northern New Jersey which the Public Service Railway and the Public Service Transportation Company, Newark, N. J., sought to make effective on Jan. 1 were suspended on Dec. 24 by the Board of Public Utility Commissioners of New Jersey for three months pending the outcome of a hearing called for Jan. 19 at Newark to inquire into the new schedule. The proposed readjustment was referred to at length in the ELECTRIC RAILWAY JOURNAL for Dec. 18, page 1111.

A Close Shave for Memphis

NOT a male member of the staff of the Memphis Street Railway, Memphis, Tenn., was overlooked in the distribution at Christmas of neatly bound holly boxes each containing a safety razor with strop. A total of 850 gifts was made to the company by A. D. McWhorter, general superintendent. An order for the razors was placed some weeks ago, and the plush lined boxes in which the razors were contained bore a special message with the imprint "Compliments of the Memphis Street Railway." Even President T. H. Tutwiler is expected to shave himself during the new year. The annual practice of distributing suitable presents to the employees' children was continued.

Downtown Dips Disapproved for Detroit

The Rapid Transit Commission of Detroit, Mich., in a report made public on Dec. 30, states that it believes the city is ready and can finance a complete rapid transit system, and that, in its opinion, construction of the "dips" would be "unwise and would set a bad precedent for the financing and construction of the remainder of the system."

Rather than build subway dips in the downtown section, the commission believes it advisable to begin subway construction on a smaller scale than that recommended in its original report, which embraced a complete unified system to all four sections of the city. It recommends that construction be started on the lesser scale only in event that the plan outlined is not put to the voters "on account of political, psychological or other reasons."

In the event that the city does not accept the plan recommended by the commission then that body recommended several alternatives, fifth among which is the subway dip plan suggested by Mayor Smith. This plan would entail construction of those portions of the Woodward, Grand River and Gratiot lines operating through the mile circle, in which the downtown section is located. Subway dips would compel the city to alter the financing plan already approved by the voters and "would fail to give train operated rapid transit and with it the special benefit to adjacent property accruing from real rapid transit."

A system of this kind could not be considered as anything but a street railway facility, the commission says.

The original recommendations of the Rapid Transit Commission called for the construction of 46.6 miles of subways at a cost of $189,000,000. This plan is listed in the latest report as No. 1. The second alternative embraces the construction of 30.75 miles of tubes; No. 3, the Woodward, Grand River and Gratiot lines, 21.1 miles. The Woodward Avenue line, 7½ miles in length, comprises No. 4. Any one of these plans can be adopted and added to in the future, if the people desire to accomplish rapid transit in that form, the commission adds, although it urged against piecemeal construction.

The Rapid Transit Commission is a body created by the charter. Members are appointed by the Mayor. The report made public on Dec. 30 was submitted to the Mayor's finance committee Dec. 10, but was not made public at once at the request of the Rapid Transit Commission. Mayor Smith announced his approval of a "dip" plan at a meeting with the police in charge of the new traffic survey and the City Council on Dec. 29.

Chicago Franchise Question to Be Aired Again

With less than four weeks remaining for settlement of Chicago's traction difficulties before the existing franchises expire, Henry A. Blair, John J. Mitchell and Frederick H. Rawson, receivers for the Chicago Railways, and Leonard A. Busby, president of the Chicago City Railway, are to be given a final opportunity to explain their attitude on the question of an extension of their present twenty-year franchises, or to bring forward any other plan for the permanent solution of the problem, when they appear before the local transportation committee on Jan. 7.

Francis X. Busch, counsel for the city, is also expected to have ready at that time the tentative draft of the proposed new unified ordinances for the surface and elevated lines.

The delay in presenting this new ordinance has been caused by a deadlock on the question of regulation. While both sides agree that a commission of three or five members shall regulate the lines, they are widely apart on the question of who shall appoint the commission. Mr. Busch insists that the appointing power be vested in the Mayor, while the companies demand that they be permitted to appoint one member, the city the other, the third to be selected by agreement between the two others.

On Monday, Jan. 10, the revised draft of the ordinance proposed by the F. J. Lisman interests of New York will be resubmitted to the City Council. Further hearings on the Chicago Motor Coach Company's city-wide bus plan are likewise scheduled for next week.

Awaiting the appearance of the traction officials and bankers, members of the local transportation committee were inclined to lay the blame for the long delay in settlement on the companies themselves. The matter has been lying dormant, they declare, since Oct. 22, when the companies promised to sit in with them for the purpose of framing a new ordinance. Many of them are openly opposed to a franchise extension for the surface lines.

At a meeting on Jan. 3, Corporation Counsel Busch warned the Aldermen that the city must enter into some kind of agreement or contract before Feb. 1 if it is to protect its rights under the 1907 ordinance. "Any first mortgage bondholder can go into the federal court after Feb. 1 and protest the further payment of the city's 55 per cent of the net earnings while the bonds are in default," he pointed out.

In the case of the Chicago Railways, said Mr. Busch, any extension of the franchise would have to be accepted by the court, in spite of repeated assurances of the receivers.

Mr. Busch also suggested to the Aldermen that it would be more advisable to pass an ordinance providing for a "day-to-day" extension because there was some question as to whether the court would permit the Chicago Railways to accept an extension for a definite length of time.

Because the filing of an intervening petition in the Chicago Railways receivership with the federal district court would be equivalent to recognition of the propriety of receivership procedure, Mr. Busch announced that he would not file the petition as he previously intended. [This petition was referred to in ELECTRIC RAILWAY JOURNAL for Jan. 1, 1927.] "The prudent thing to do," Mr. Brush said, "is to keep out as long as the city's rights are respected."

Terminable Permit Favored

Commission Recommends Passage of Legislation to Remove the Present Limitation

Elimination of the present twenty-year limitation on electric railway franchises in Illinois has been recommended by the state terminable permit commission. Announcement to this effect was made on Jan. 4 by a sub-committee. The commission went on record as favoring the right to terminate the permit, for cause or by purchase, and as believing in the soundness of the policy of regulation of public utilities by some governmental agency in matters of rates, service and financing, protecting the utility, the local municipality and the customers in their respective rights.

The report was submitted to the commission by a sub-committee of which Senator Richard Barr, Joliet, is chairman. Other members are Thurlow G. Essington, Streator, and Harold Kessinger, Aurora. The report follows:

> It is the conclusion of this commission, and the practical working under the laws of other states shows, that the terminable permit has been the occasion of continuity of operation, not restricted by misunderstandings and bickerings incidental to the termination of an old franchise and the securing of a new one; that it has permitted wise and cheap financing, which, in turn, has permitted continuous growth, expansion and extensions required for the service of the inhabitants of the different communities served; that public utility questions have, to a large measure, been removed from politics; and that, as a result of all of these things, a higher standard and character of service has been attained, rates have been reduced, confidence of the investors on the one hand and of the utility patrons on the other hand has been established; and the entire public utility situation has been enormously improved.
>
> This commission found that in the laws of the various states there are differences as to what body or authority shall issue the terminable permits, what body or authority shall have the right to revoke such permits, and what body or authority shall regulate the utility companies during the existence of the permits; but, so far as the terminable permit itself is concerned, there was practically unanimity of opinion in its favor and in its superiority to the definite term franchise.
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> The commission is further of the opinion that, in the issuance of terminable permits, the rights of the municipality to make reasonable requirements regarding the use of its streets and public places shall be maintained; and that the right to terminate the permit for cause or by purchase shall be provided. The commission further states unqualifiedly its belief in the soundness of the policy of regulation of public utilities by some governmental agency in matters of rates, service and financing, protecting the utility, the local municipality and the customers in their respective rights, but where this power of regulation should be placed is a matter upon which the commission was not authorized by the act of its creation to investigate or report.
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> This commission therefore recommends that appropriate legislation be adopted at this session of the General Assembly removing the present limitation of twenty years as the maximum term for which franchises may be granted to street railways; and authorizing the issuance of terminable permits to public utilities operating within this state, under such terms and conditions as may be deemed wise by this General Assembly to insure continuous and efficient operation of the utilities and to protect the public as to service and rates and its rights in and to streets and public places.

Final Briefs in Denver Franchise Case

Final arguments in the case involving the franchise of the Denver Tramway, Denver, Col., will be heard by the Supreme Court of the United States on about Jan. 15. At that time the court will be asked to decide whether the tramway has a perpetual franchise or whether it is bound by a twenty-year franchise, granted in 1906 and calling for a 5-cent fare. The contention of the city is that the company is bound to carry passengers in Denver for a 5-cent fare, in accordance with the 1906 franchise. The company argues that the 1906 franchise is a regulatory statute that became invalid when it was established that a 5-cent fare would not yield a reasonable return on the money invested.

In the District Court in Denver, Judge Lewis decided that the Denver Tramway has a perpetual franchise granted by ordinances of 1883 and 1886. He also held that the company is entitled to a return of 7½ per cent on a valuation of $23,000,000, and that it is confiscatory for the city to seek to impose a fare that does not provide the proper return.

Attorneys for the city will argue that granting of perpetual charters is forbidden by the state constitution of Colorado, and that the State Supreme Court has so ruled on three occasions.

Parking Banned in Rush Hours

In accordance with a new traffic regulation recently promulgated by the police department, parking is forbidden on Broad Street, Newark, N. J., in the district between the Lackawanna Railroad station and Clinton Avenue, and on Market Street from the Pennsylvania Railroad station to the court house, between 8 and 9 a.m. and 4:30 and 6 p.m. The new rule became effective on Jan. 3, after extended investigations made by the city's engineers, Parsons, Klapp, Brinckerhoff & Douglas, had demonstrated the serious interference to traffic caused by automobiles parked in solid rows along these streets, sometimes two or three abreast. The new regulation will be tried for a month. Checks are now being made to determine the effect on speed of traffic movement, particularly that of street cars and buses. Reduced congestion and increased speed are expected to result.

Wages Being Discussed in Milwaukee

Negotiations are under way for a new supplementary wage agreement for the next six months beginning Jan. 1 between trainmen and officials of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis. A demand for a wage boost of 5 cents an hour has been drafted for the trainmen in Milwaukee, Racine and Kenosha, and on all interurban lines operated by the company. A 5-cent increase was requested six months ago, but was turned down. The increase, if granted, will apply to one-man car operators, who are receiving a maximum of 66 cents an hour now, and two-man car trainmen, who are now receiving 61 cents an hour.

A 2½-Cent Fare for Short Pittsburgh Line

The Pittsburgh Railways, Pittsburgh, Pa., established a round-trip fare of 5 cents on Jan. 1 on what is known as the Library Shuttle Route No. 525. This route, located in the Borough of Braddock, is only about 0.2 mile long, operating from Library and Braddock Avenues to Bell and Jones Streets. It serves as a transfer link with two other routes and also affords a connection between the business district of Braddock and the residential district near Bell and Jones Streets. The distance is short, but the territory is rather hilly. However, it was apparent that very few persons were willing to pay 8⅓ cents merely for a ride over this section. Inasmuch as the single car used on this route always had plenty of room it was decided to give the local public the opportunity to use the service at the lowest feasible price. This led to the establishment of a round-trip non-transfer rate of 5 cents, much to the satisfaction of the Braddock merchants, who believe this will stimulate trade.

Transit Survey in Philadelphia

An investigation into the transportation facilities in Philadelphia, Pa, which will be followed by public hearings and action on future transit needs, is to be undertaken shortly in Philadelphia by the Pennsylvania Public Service Commission.

In furtherance of this plan, Charles C. McChord, former chairman of the Interstate Commerce Commission, has been engaged by the commission to make a comprehensive survey of the city's transit problems. His engineering and legal aids will make an exhaustive study of the city-P.R.T. contract of 1907 and the entire structure of the company's underlying companies preliminary to submitting the report to the Pennsylvania Public Service Commission. The McChord survey will also take in the Broad Street subway, the Chestnut Street tube and the Frankford elevated system. The final argument on the latter lease agreement had been scheduled for Feb. 7. However, it was indicated that final decision on the Frankford elevated and Chestnut Street subway leases would be withheld by the commission pending the outcome of the inquiry now authorized.

Simultaneously with the transit study the commission will begin its probe of the car riders' complaints about alleged curtailment of the Philadelphia Rapid Transit Company's service.

Franchise Draft Ready in Kansas City

The proposed new franchise for the Kansas City Public Service Company, Kansas City, Mo., recently drafted by the franchise committee of the City Council failed to touch upon two important considerations which will have o be taken up when work on the actual ranchise is started. These are buses and extensions. Just what provision will be made with regard to a new grant for buses is a point upon which the special franchise committee is undecided. The question of extensions is bound up to some extent with the question of buses. The old franchise required specific extensions, and new trackage each year. However, with the increased interest in motor transportation such provisions are deemed impracticable. For them will probably be substituted a requirement of extension when necessary. Councilman A. N. Gossett, chairman of the special franchise committee, says that a draft of the final franchise will probably be ready for submission to the Council by Feb. 1.

San Francisco Trainmen Receive Pay Increase

Nine hundred trainmen of the San Francisco Municipal Railway, San Francisco, Cal., received an increase in pay of 20 cents a day, effective Jan. 1. Under the new scale platform men will receive $6 a day instead of the former $5.80. The increase makes a total of 60 cents a day during the past six months, an increase of 40 cents a day having been granted platform men last summer. The increase ends a long deadlock with the Board of Supervisors, the Mayor and the Board of Works, during which time it was charged that if further increases were granted a deficit would be created in the operating revenue of the road.

Supervisor James B. McSheehy, chairman of the finance committee of the board, was among those who doubted that receipts of the Municipal Railway would take care of the additional wages. He is reported to have said:

> The finances of the Municipal Railway were drained to the last drop to handle the 40-cents-a-day raise to platform men last April. There is nothing else they can use. Not a nickel is available to cover the 20-cent increase granted to other workers of the road last week.

The business of the railroad, according to Superintendent Boeken, has shown no increase over last year's receipts for the past six or seven months. He explained the lack of funds as follows:

> When the raise was granted last April, and for a month or two thereafter, the road was running along with an average normal growth in receipts amounting to approximately 3½ per cent annually. We had every reason to anticipate a continuance of that growth, but the falling off of the last six months has been a serious disappointment.
>
> I believe the condition is only temporary. I attribute it to the industrial unrest in part, the strike that has slowed up construction and other unlooked for local conditions that may be removed at any time.

Mr. Boeken explained that the increase in receipts has amounted to only $25,000 for the six months period, instead of the $125,000 expected on the basis of the normal 3½ per cent annual growth. He suggested several alternatives in case no rally occurs to bring the increase in receipts back to normal. He is quoted as follows:

> The $200,000 bond redemption may be put up to the taxpayers in June; the road may be refinanced; fares may be increased; our $20,000 monthly depreciation fund may be drawn against; the city may repay $83,000 it still owes on the railroad's loan for the tunnels; or the city might even pay the railroad interest on funds on deposit for the past fifteen years, aggregating approximately $500,000.

The railroad is paying off $200,000 annually on its funded debt.

Drastic Parking Ordinance in Philadelphia

A bill to ban parking in Philadelphia, Pa., was reported favorably in the City Council by the public safety committee on Dec. 30. If the measure becomes a law it will abolish parking of cars between 6:30 a.m. and 7 p.m. in the large area within the boundaries of Spring Garden and South Streets and the Schuylkill and Delaware Rivers. Besides, it will bar parking during any hours of the day or night on streets less than 20 ft. wide in any part of the city and particularly specified Fifth, Sixth, Eleventh, Twelfth, Thirteenth, Broad, Fifteenth and Sixteenth Streets in the 24-hour ban. It also provides that no cars may be parked in any street in the city between 3 a.m. and sunrise.

A second ordinance provided for the establishment of a "pound" where cars violating the no-parking laws may be taken by the police. This measure was returned by the committee to City Solicitor Gaffney for a ruling on its legality. One of the disputed points in the measure was the extent of the city's liability in case impounded cars were damaged.

Director Elliott asserted at a hearing on Dec. 30 that the new measures would be enforced to the full capacity in his department or else he would bring the law back and tell the people why it failed. His plea came at the end of the three-hour session of the committee, during which representatives of various organizations and business establishments appeared to present their arguments. It was stated that business firms located on streets in the center of the city were oppressed by drivers who lined the streets with parked automobiles.

J. Barton Weeks, president of the Keystone Automobile Club, issued a statement opposing the no-parking ordinance and charging that existing parking measures had never been enforced and were at present dead letters.

Kane J. Green, president of the Automobile Club of Philadelphia, declared that that organization was heartily in favor of the ordinance. He said that if there were room for proper movement of traffic and also for parking space it was all right to have both, but when parking interfered with movement as it did in Philadelphia, then it was logical that parking should be prohibited.

Further Suspension of International Railway Schedule

The Public Service Commission on Jan. 4 further suspended to and including April 12 increases in rates filed by the International Railway, proposed as effective on Oct. 16 last, on its Buffalo-Niagara Falls high-speed line, the Buffalo-Lockport-Olcott division and in the city of Lockport. The schedules are to remain under suspension until April 12 unless otherwise ordered by the commission. The commission suspended the proposed increase in rates on Oct. 6 to and including Jan. 12 pending a showing of necessity by the railway for the proposed increase. The order of Jan. 4 continues the suspension until April 12.

News Notes

Fare Raised.—The Lake Superior District Power Company was recently authorized by the Michigan Public Utilities Commission to charge an 8-cent cash fare in Ironwood, Mich. The old fare was 5 cents.

Tokens in Indianapolis.—Metal tokens supplanted tickets on the cars of the Indianapolis Street Railway, Indianapolis, Ind., on Jan. 1. Conductors, however, continued to receive outstanding tickets. Fare boxes have been installed on the cars and passengers will deposit the cash fare of 7 cents or a token, which may be purchased four for a quarter. The cost of installation was about $30,000 and the company issued pamphlets telling of the reasons for the installation.

$106,000 Bonus in Los Angeles.—The Los Angeles Railway, Los Angeles, Cal., distributed $106,000 as 1926 bonuses to 2,147 trainmen in its service. All men receiving the special awards were presented with their checks by the superintendent of their particular division. It was mentioned recently in the ELECTRIC RAILWAY JOURNAL that the special award plan on the Los Angeles property had been changed for 1927 so that every trainman in the company could participate regardless of his division affiliations.

Another Skip-Stop Hearing in Baltimore.—The Maryland Public Service Commission has set Jan. 17 as the date to resume hearings on the skip-stop system that has been placed in operation during the morning and evening rush hours by the United Railways & Electric Company, Baltimore. The first hearing was held a few weeks ago.

New Line Planned.—A plan of action is to be formulated shortly looking toward construction by the Pacific Electric Railway, Los Angeles, Cal., of a line through Santa Ana Canyon between Stern and Corona. Charles A. Bland, manager of the industrial and transportation bureaus of the Pacific Electric Railway, has stated that the committee of fifteen, to which was referred the plan for a short line from the northeast to Long Beach Harbor, has been authorized to work out the details which will give a wide section of that country quick ingress to the harbor. The distance between Stern, at which the Pacific Electric Railway line now ends at the western mouth of the canyon, and Corona, at the other end, is about 14 miles. With that stretch of line built, the committee believes that the road will see its way clear to connect with Marlboro and Anaheim with another 5-mile stretch.

Greetings from Washington.—A token inscribed with the names of the Washington Railway & Electric Company and the Capital Traction Company and melted onto a white beveled edge 6 x 4 card carries the Christmas and New Year's greeting of C. Melville Sharpe, executive assistant of the Washington Railway & Electric Company, Washington, D. C. The card reads as follows: "C. Melville Sharpe sends a token for Christmas and wishes you kilowatts of joy during the New Year."

Trolleys Meet Emergency.—The Boston & Worcester Street Railway, Framingham, Mass., which operates a bus line between Hudson and Fayville, Mass., via Marlboro and Southboro, was forced recently to return to trolley operation to provide service to the public. A treacherous ice storm made the hills impassable for buses. The trolleys were returned to service for safety sake.

Temporary Fare Agreement Extended.—At a special session of the City Council of London, Ont., on Dec. 28 the temporary agreement between the city and the London Street Railway was extended for three months. Under this agreement the rate of fare is 5 cents, instead of 7 with nine tickets for 25 cents, as specified in the by-law. The Council proposes to go into the matter fully and will submit to the electors some plan of definite settlement of a lengthy controversy. At the municipal election the people turned down a proposal for renewal of franchise and also a by-law for purchase of the lines. The question of granting licenses to independent buses operating in opposition to the London Street Railway was discussed briefly.

Olive Street Not Wide Enough.—Seven members of the St. Louis, Mo., Board of Aldermen, who visited New Orleans to inspect thoroughfares with parkways for trolley cars, returned to St. Louis convinced that the plan was not practical for Olive Street. Parkways for cars of the St. Louis Public Service Company have been proposed for Olive Street when that street is widened from 60 to 100 ft. between Twelfth Boulevard and Channing Avenue. Several of the Aldermen said that their observations in New Orleans, where many streets, both wide and narrow, include such parkways, convinced them that Olive Street would not be wide enough to make a curb-off trolley right-of-way economical.

Volunteers to Reduce Fares.—David P. Strickler, president of the Colorado Springs & Interurban Railway, Colorado Springs, Col., recently proposed to the City Council to reduce fares, both on the company's tramcars and buses. The reduction, if granted, would do away with the two rides for 15 cents, substituting the sale of fourteen rides (checks) for $1. This is equivalent to a reduction of one-fourth of 1 cent per ride. The Council asked Mr. Strickler to make an offer on a 50-cent lot. This will likely be submitted and the whole approved.

More Safety in Altoona.—A safety campaign to extend throughout 1927 was launched by the employees of the Altoona & Logan Valley Electric Railway and its subsidiary, the Logan Valley Bus Compauy, Altoona, Pa. Two teams are being organized, one including men on the roster designated by even numbers, the other team designated by odd numbers. The contest will continue from week to week with an award made to the teams monthly. A map 30 ft. square, showing the entire holdings, is to be used to mark the "accident centers."

Foreign News

South African Trams Lose Revenue from Bus Competition

Municipal tramways in South African cities are finding it increasingly difficult to meet the competition of the bus lines, according to a report made to the Department of Commerce. As an illustration of the seriousness of the position from the standpoint of the tramways, the report points out that in 1925 the trams carried 2,500,000 fewer passengers than they did in 1924 with a loss of revenue of more than £30,000.

Among the remedies suggested, one that is receiving serious consideration is the setting up of a transport commission by either the union government or the various provinces, to regulate routes, fares and general working conditions. The big problem is to find the proper economic fields for both trams and buses, the question being aggravated by the fact that the trams are largely municipal ventures and the buses private enterprises.

Swiss-Argentine Railway Capitalized at $6,000,000

"La Société d'Electricité pour l'Amerique du Sud" is the name of the new $6,000,000 company which has recently been formed in the city of Zurich t take over control of the following companies: The Great Southern Railway i Buenos Aires; the tramway system an the electricity and gas works in Bahi Blanca, and the Compania American de Luz at Asuncion. This new company, according to reports which ar being circulated, is said to be finance by a group of English, Swiss an Italian financiers.

Hull Corporation Tramways Reinstates Strikers.—Strikers of the Hul Corporation Tramways who walked ou in the general tramway strike last May are gradually being absorbed into service again by means of a plan adopte by the tramways committee. A new arrangement of a five-day working wee makes it possible to reinstate th strikers and at the same time retai the services of the volunteers who hav been filling the other men's places fo the last seven months. The plan i also being aided by increasing the bu service.

Transformer Station for Midi o France Railway.—In connection wit the electrification of the railroad between Bedous and the Spanish frontie Midi of France Railway has latel placed a contract with the Sociét Alsacienne de Constructions Mécaniques of Belfort for the equipment o a 60,000-volt outdoor transformer station. The order includes three larg transformers to convert three-phase 50-cycle current and eighteen 575-kw six-phase converters to give continuou current at 1,570 volts.

Recent Bus Developments

Twin City in Taxi Field

Announcement Made of Cab Purchase at Minneapolis as Further Co-ordination Move

The Twin City Rapid Transit Company, Minneapolis, Minn., has acquired a majority of the stock and control of the Yellow Cab Corporation of Minnesota. The deal was announced on Dec. 31. It was negotiated through Lane, Piper & Jaffray, Inc., Minneapolis, brokers, and is reported to have involved slightly more than $500,000.

This transaction followed in three days announcement of the formation of the Delaware corporation to merge the Yellow Cab and the Red Top taxi service in the Twin Cities, the Yellow Cab taxi service in Duluth, Minn., the Town Taxi and Drive Yourself services in Minneapolis and Rochester, Minn., which involved about $1,000,000, it was reported at the time.

Co-ordination Plan Achieved

With the consummation of this deal the Twin City Rapid Transit Company now controls the electric railway service in the Twin Cities area, the interurban bus service and the majority of the taxi service, there being still some independent companies operating. Horace Lowry, president of the company, said:

> The purchase of the control of the taxicab fleet is sound and logical from every standpoint. When we learned that the five companies were consolidated we decided that the next progressive step toward the unification of transportation in the Twin Cities should be taken by us if we were to serve the interests of the public.
>
> We therefore purchased the stock control of the merged companies. Duplication of the organizations and the facilities of the taxi companies has been a source of unnecessary traffic congestion and has not been conducive to the best interests of the public. We are going to do away with this duplication and bind the taxicab business into one sound operating unit, and the Twin Cities may be assured of our utmost efforts toward an improved service which will not be excelled in this country.
>
> While control of the taxicabs in the Twin Cities, together with the ownership of the railway and the bus lines, gives the parent company virtual control of public transportation service, that service is under supervision either by the state or the city. I believe that this unification will best serve the public interest in that it gives more efficient and better service, and I believe further that, given time, we can demonstrate clearly that the transaction is a sound and logical one, and is the ultimate solution of modern transportation difficulties.

City in Front Rank

Robert F. Pack, chairman of the board of the newly formed Yellow Cab Corporation, who as head of the Northern States Power Company is familiar with public service operation, said:

> There is no reason why the taxicab business, offering a necessary public service, should not be run on the same high plane with other transportation facilities. The new system established in Minneapolis by this deal puts the city in the front rank of a new transportation development.

Formation of the Yellow Cab Corporation of Minnesota was first reported by way of Chicago on Dec. 13, but was not confirmed in Minneapolis until Dec. 28. P. W. Loudon was announced as president and J. H. Colman as secretary-treasurer. The company has 330 Yellow Cabs and Red Tops, 50 Hertz sedans, 52 Chevrolets, Chryslers and Fords, with 20 new Red Tops ordered.

The new bus corporation already had advanced the taxicab rate 5 cents a mile from 35 cents minimum and 10 cents for each additional half mile with no charge for extra passengers, and was to give the drivers from $2.50 to $4 more wages a week on a commission basis, and had ordered that all of the taxicabs should be completely inclosed.

The merged lines will be reorganized in the near future. In the formation of the new corporation gross earnings of the merged systems for 1925 were given at $1,667,750 and for the twelve months ended June 30, 1926, at $1,632,652. Eight thousand shares of Class A common stock of the new corporation were reported sold at a price of $22.50 and accrued dividend.

It will be recalled that the motor bus subsidiary of the Twin City Rapid Transit Company acquired the Twin City Motor Bus Company line between the Twin Cities in July 1924, the Brown bus line in November, 1925, and the Green bus line in January, 1926, comprising all the interurban passenger bus service and some suburban lines operated out of the city.

Massachusetts Bus Law Upheld by Supreme Court

Statute Found Not to Be Arbitrary or Unreasonable in Its Requirements —Bus Company, Competing with Electric Railway, Cannot Evade Massachusetts Law by Mingling Interstate with Intrastate Passengers

IN A DECISION handed down by Justice Butler the United States Supreme Court on Jan. 3 upheld the validity of the Massachusetts motor vehicle law as applied to buses. The decision affirmed the action of the lower courts in dismissing the suit of the Interstate Buses Corporation against the Holyoke Street Railway and various municipal, county, district and state officials of Massachusetts. The Supreme Court decision, in brief, held that the bus company could not evade the Massachusetts law by mingling interstate with intrastate passengers and that the law is not arbitrary or unreasonable in its requirements.

Local Licenses Required

The Massachusetts law requires that buses apply for a license and provides penalties for failure to do so and for operation over routes not approved. The Interstate Buses Corporation runs on regular schedule between Hartford, Conn., and Greenfield, Mass., passing through various Massachusetts towns and cities. Its route for some distance parallels the tracks of the Holyoke Street Railway, the lines of which serve several communities in Massachusetts.

The bus company did not take out a license and a number of its chauffeurs were arrested. The company brought suit to restrain such arrests and to test the Massachusetts law. It relied on the fact that its buses follow an interstate route, claiming that because of this they were not subject to the Massachusetts law. The lower court found that the company did an intrastate passenger business as well as an interstate business, carrying both classes of passengers in the same bus.

The suit was brought to restrain the enforcement of a state statute relating to common carriers of passengers by motor vehicles as in conflict with the commerce clause of the Constitution of the United States and with the due process clause of the Fourteenth Amendment. The case was heard before a court of three judges on an agreed statement of facts, and a final decree dismissing the complaint was entered.

Sections 45, 48 A and 49 of c. 159, General Laws, as amended by c. 280, Acts of 1925, contain the provisions attacked:

No person shall operate a motor vehicle upon a public way in any city or town for the carriage of passengers for hire so as to afford a means of transportation similar to that afforded by a railway by indiscriminately receiving and discharging passengers along the route on which the vehicle is operated, or as a business between fixed and regular termini, without first obtaining a license. The licensing authority in a city is its council, in a town is its selectmen; and, as to public ways under its control, is the metropolitan district commission.

Electric Railway Objects

No person shall operate a motor vehicle under such license unless he has also obtained from the Department of Public Utilities a certificate that public convenience and necessity require such operation. Any one operating under a license from local authority and a certificate from the department is declared to be a common carrier and subject to regulation as such. Violations of Secs. 45-48 or of any order, rule or regulation made under them are punishable by fine or imprisonment or both. And the act gives to the Supreme Judicial and Superior Courts jurisdiction in equity to restrain any violation upon petition of the department, any licensing authority, ten citizens of a city or town affected by the violation, or any interested party. Neither license nor certificate is required in respect of such carriage as may be exclusively interstate.

For many years the appellee, the

Holyoke Street Railway, has been a common carrier of passengers by railway in Massachusetts through Holyoke, South Hadley, Granby, Amherst and into Sunderland. Appellant is engaged in the business of transporting passengers for hire by motor vehicle and operates buses between Hartford, Conn., and Greenfield, Mass. It has run its buses between Hartford and Springfield since Dec. 1, 1924, and north of Springfield to Greenfield since about Dec. 15, 1925. Its route in Massachusetts passes through Springfield, West Springfield, Holyoke, Granby, Amherst, Sunderland, Deerfield and Greenfield. With certain exceptions, all its buses run the whole distance between Hartford and Greenfield.

It transports persons from one state into the other, and also those whose journeys begin and end in Massachusetts. Both classes of passengers, intrastate and interstate, are carried in the same vehicles. Intrastate passengers constitute a very substantial part of the whole number carried in Massachusetts. The appellant maintains an office and garage at Springfield and advertises its route and rates.

The buses are operated between fixed terminals in Massachusetts. They run regularly on public ways parallel to and alongside the tracks of the railway and afford transportation similar to that furnished by that company. They stop regularly and also on signal to receive and discharge passengers.

RAILWAY EARNINGS HURT

The operation of the buses in competition with the railway has resulted in substantial loss to the latter. It was established that the appellant has not obtained a license from any of the cities or towns served by the railway, which caused plaintiff's employees to be arrested and prosecuted.

After receiving the facts as just set down the Supreme Court concluded its opinion as follows:

> The statutory provisions in question have been sustained by the highest court of Massachusetts. New York, N. H. & H. Railroad vs. Deister, 253 Mass. 178; Barrows vs. Farnum's Stage Lines, — Mass. —; Boston & M. R.R. vs. Cate, — Mass —; Boston & M. R.R. vs. Hart, — Mass. —; Commonwealth vs. Potter, — Mass.—. And these decisions were followed by the district court in this case.
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> Appellant's principal contention is that the act contravenes the commerce clause. If as applied it directly interferes with or burdens appellant's interstate commerce, it cannot be sustained regardless of the purpose for which it was passed. See Shafer vs. Farmers Grain Co., 268 U. S. 189, 199; Real Silk Mills vs. Portland, 268 U. S. 325, 336; Colorado vs. United States, 271 U. S. 153, 163; Di Santo vs. Pennsylvania, — U. S. —. The act existed in some form before interstate transportation of passengers for hire by motor vehicle was undertaken. Its purpose is to regulate local and intrastate affairs. Barrows vs. Farnum's Stage Lines, supra. No licenses from local authorities or certificate of public convenience and necessity is required in respect of transportation that is exclusively interstate. Cf. Buck vs. Kuykendall, 267 U. S. 307; Bush Co. vs. Maloy, 267 U. S. 317. The burden is upon appellant to show that enforcement of the act operates to prejudice interstate carriage of passengers. The stipulated facts do not so indicate. The threatened enforcement is to prevent appellant from carrying intrastate passengers without license over that part of its route which is parallel to the street railway. Its right to use the highways between Springfield and Hartford is not in controversy. While it appears that in Massachusetts both classes of passengers are carried in the same vehicles, it is not shown what part of the total number are intrastate or interstate. The record contains no information as to the number of persons, if any, traveling in interstate commerce on appellant's buses over the part of the route competing with the street railway. It is not shown that the two classes of business are so commingled that the separation of one from the other is not reasonably practicable or that appellant's interstate passengers may not be carried efficiently and economically in buses used exclusively for that purpose or that appellant's interstate business is dependent in any degree upon the local business in question. Appellant may not evade the act by the mere linking of its intrastate transportation to its interstate or by the unnecessary transportation of both classes by means of the same instrumentalities and employees. The appellant relies on Western Union Tel. Co. vs. Kansas, 216 U. S. 1, and Pullman Co. vs. Kansas, 216 U. S. 56. But there the state was using its authority as a means to accomplish a result beyond its constitutional power.
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> ACT IS NOT CONFISCATORY
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> There is no support for the contention that the enforcement of the act deprives it of its property without due process of law. Undoubtedly, the state has power in the public interest reasonably to control and regulate the use of its highways so long as it does not directly burden or interfere with interstate commerce. Packard vs. Banton, 264 U. S. 140, 144; Kane vs. New Jersey, 242 U. S. 160; Hendrick vs. Maryland, 235 U. S. 610. Cf. Opinion of the Justices, 251 Mass. 594, 596. The terms of the act are not arbitrary or unreasonable. Appellant has not applied for and does not show that it is entitled to have a license from the local authorities or a certificate of public necessity and convenience from the department. Plainly, it has no standing to attack the validity of the statute as a violation of the due process clause.

Four More Rochester Routes Sought

The Rochester Railways Co-Ordinated Bus Lines, Inc., Rochester, N. Y., filed with the Public Service Commission on Jan. 4 a petition for a certificate for the operation of bus lines in the city of Rochester, the village of Hilton and the towns of Parme and Greece, Monroe County. Four routes are proposed in this petition, known as the Grand View Beach line, the Island Cottage Bus Line, the Ridge Road Bus Line and the Manitou Beach line, also known as the Long Pond Route. The Ridge Road Passenger Lines, Inc., which formerly operated the Ridge Road bus line, has been merged with the petitioner. A public hearing will be held on this application.

Extension of Bus Service Permitted.—A certificate has been granted by the Railroad Commission to the Pacific Electric Railway to operate a coach service for the transportation of passengers between Beverly Hills and Los Angeles, Cal., and intermediate points along the line.

Service Discontinued.—Permission to discontinue the operation of regular bus service between Salt Lake City and Ogden, Utah, effective on Dec. 25, was granted the Bamberger Transportation Company by the Public Utilities Commission of Utah. Application for permission to discontinue such service was filed with the commission by Julian Bamberger, president and general manager of the bus subsidiary of the Bamberger Electric Railroad, on the ground that the public did not seem to require this service at this season of the year. Attention is called in the application to the fact that from Dec. 15 to 21, both inclusive, only 134 passengers were carried by the buses. The total cost of operating the buses during that period was $536, while the total revenue was only $135.

Bus Agreement Lost.—The track removal agreement for Filbert Street, Philadelphia, Pa., with the Philadelphia Rapid Transit Company and its subsidiaries was halted recently. The pact was lost en route to Mayor Kendrick and no explanation has been offered. The agreement carries a ten-year bus franchise on the Pennsylvania Boulevard, which is to take the place of Filbert Street. The project to be carried out under the agreement by the city and the Pennsylvania Railroad, at a cost of $53,000,000, includes a tunnel from the West Philadelphia Station to Broad Street Station, improvements to both terminals, widening of Twentieth Street, a Schuykill driveway and other highway projects.

Seeks to Run Line in Western Utica.—The Public Service Commission held a public hearing on Dec. 30 on the petition of the Utica Railway Co-Ordinated Bus Lines, Inc., for a certificate for the operation of a bus line in the western part of the city of Utica. C. N. Phillips, attorney, representing Kernan & Kernan, counsel for the company, appeared for the petitioners. The city of Utica was not represented, but the commission was advised by Clarence E. Williams, Corporation Counsel, that the city is agreeable to granting the franchise. The proposed route will, it is shown, give transportation service to a section of the city which is rapidly developing. Rates of fare are to be the same as those charged by the parent company, the New York State Railways, with transfer privileges to and from such lines.

Bus Service to Be Furnished.—The Eastern New York Utilities Corporation applied to the Public Service Commission on Dec. 29 for approval of a declaration of abandonment of two parts of its line in Hudson. The company alleged that by reason of changes in conditions, development of the city and economic conditions affecting the properties of the company the petition was advanced for the discontinuance with the approval of the city of Hudson. The Eastern New York Transportation Corporation, a subsidiary, proposes to furnish bus service and exchange transfers from its main line to Hudson and in the town of Greenport, where the bus service will be provided.

Buses Supplying Service.—The strike of the street railway employees of the Danbury Power & Transportation Company, Danbury, Conn., is gradually abating. The company was granted temporary certificates to operate buses over any and all of its routes two weeks ago by the Public Utilities Commission. Ten buses are now in use and recently the company placed an order with the Yellow Truck & Coach Manufacturing Company, Chicago, Ill., for four more of the latest type coaches. This step is in line with the plan to motorize its franchise holdings in Danbury and Bethel.

Financial and Corporate

Patronage Gains on Chicago Surface Lines

For the first eleven months of 1926, ended Nov. 30, 1,433,929,014 passengers were carried by the Chicago Surface Lines, Chicago, Ill., against 1,382,623,114 in the corresponding period of 1925. A more accurate picture of the heavy amount of traffic handled over the corresponding months of last year is noted in the following tabulation:

	1926	1925
January	129,604,602	127,666,571
February	121,282,868	115,830,619
March	131,839,632	128,009,030
April	131,452,890	126,052,447
May	132,939,381	127,542,240
June	132,980,301	125,684,909
July	130,235,208	124,566,209
August	129,214,055	125,002,113
September	127,149,619	122,964,778
October	135,878,579	132,515,318
November	131,351,870	126,788,880
December	....	132,949,576

Divisible receipts for November amounted to $628,628 after taxes, renewals and return on purchase price, against $716,111 in October and $422,172 in November, 1925.

The income account for November, 1926, compared with that of the corresponding month in 1925 is as follows:

	1926	1925
Gross earnings	$5,151,860	$4,939,131
Operating expenses and taxes	3,813,294	3,834,735
Residue receipts	1,338,566	1,104,396
Joint account expense	37,725	10,000
5 per cent interest on purchase	672,212	672,224
Divisible receipts	628,628	422,172
City's 55 per cent	345,746	232,194
Company's 45 per cent	283,883	189,977

Certificates and Coupons Burn in St. Louis

Almost $5,000,000 of canceled obligations of Receiver Rolla Wells of the United Railways, St. Louis, Mo., were burned in the fireplace of the office of James J. O'Connor, clerk of the United States Court for the Eastern District of Missouri in the Federal Building, St. Louis, on Dec. 27. The proceeding marked another step toward the final reorganization of the railway properties. Series B of certificates issued by Receiver Wells totaling $4,200,000 and $630,000 in interest coupons were fed to the flames after they had been redeemed. The certificates were issued by Receiver Wells in 1923 to take up other securities of the railways.

Negotiations for a new blanket franchise from the city of St. Louis is the next and probably the final step in the reorganization program.

Reorganization Plans of Indiana Property Going Forward

Reorganization of the Fort Wayne, Van Wert & Lima Traction Company, operating more than 65 miles of trackage between Lima, Ohio, and Fort Wayne, Ind., is being perfected, and articles of incorporation for the new corporations controlling the line have been filed with the Secretaries of State in both Indiana and Ohio. The incorporators for the Indiana corporation are Henry C. Paul, Frank M. Cutshall, James M. Barrett, Jr., R. Earl Peters and Leigh Hunt, all of Fort Wayne, while Paul C. Martin, Homer C. Corry, C. I. Gallagher, H. M. Lacey and S. A. Titer, all of Springfield, Ohio, appear on record in the incorporation of the Ohio organization. The traction line serves the intermediate towns of New Haven and Monroeville in Indiana and Dixon Convoy, Middlepoint, Delphos, Scott's Crossing and Elida in Ohio.

The property comes into possession of the new company through its purchase last October by Edward Hopkinson, Philadelphia, representative of the bondholders. The purchase price was $150,000, the property being offered for sale by Mr. Paul, receiver, who had charge of the line since 1921 on an order of the United States federal court. The operation of buses and sale of electric current also are provided for in the articles of incorporation.

$1,137,700 of Winnipeg Stock Subscribed in Forty-eight Hours

The second customer-ownership campaign of the Winnipeg Electric Company, Winnipeg, Man., proved a remarkable success. The sale of 2,500 shares of the company's 7 per cent cumulative preference stock opened on Dec. 13 and was advertised to continue for ten days, but so great was the demand for the shares that the sale closed within 48 hours with 11,377 shares ($1,137,700) applied for by 2,222 customers.

The shares were offered through company employees at par, $100 a share, under a customer-ownership plan. The success of the campaign was due to the energetic efforts of the company and the extensive internal organization, together with a well-planned publicity program conducted by the company. The Customer Ownership Company of Canada, Ltd., co-operated with the company in organizing and directing the campaign. While a limit of 50 shares to any one customer was set, it is interesting to note that the number of shares applied for averaged five shares to each customer.

The first 2,500 shares offered by the company form part of an issue of $3,000,000, par value, of preferred stock put on the market a few years ago, and authorization for new preferred stock to take care of the oversubscription will be sought from the shareholders at a meeting to be held on Jan. 20.

The first customer-ownership campaign undertaken by the Winnipeg Electric was conducted in March, 1925, and 2,645 shares were sold to 1,280 purchasers. As a result of the two campaigns the Winnipeg Electric Company will have nearly 3,500 local preferred shareholders.

The sale just concluded marks one of the most outstanding customer-ownership campaigns undertaken by any public utility in the Dominion.

Another Dividend on Common Stock.—The Springfield Railway, Springfield, Mass., recently declared a dividend of $1.15 a share on the common stock and the regular semi-annual preferred dividend of $2 a share, both payable Jan. 3 to stockholders of record of Dec. 20. Six months ago $1.60 was paid on the common stock.

Capital Increased.—The British Columbia Railway, Vancouver, B. C., decided at its annual meeting in London, held on Dec. 16, to increase its capital to £5,320,000 by the issuance of 320,000 new shares of stock at £1 each. Successful operation of the company during the past year was evidenced in the address made to the shareholders at that meeting by George Kidd, the president, who has been in charge of its affairs for 12 years. He told how the railway had carried more than 72,500,000 passengers and 417,000 tons of freight, and also that motor coaches and lorries had been added to the equipment as feeders to the railway system.

Abandonment Record Closed. — The Public Service Commission of New York on Jan. 5 granted the petition of the United Traction Company for approval of a declaration of abandonment of its South Ferry Street line in the city of Albany. There has been no operation on this ⅛-mile route for ten years and in 1925, when the street was repaved, it was agreed with the city to remove the tracks, which was done. The application just granted was made to close the records of the company.

Power Property Sold to Traction President.—The sale of the Clyde River Power Company, Richford, Vt., is reported to have been made to John J. Flyn, president of the Burlington Traction Company, Burlington, Vt., for a sum said to be $500,000. The property that passes to Mr. Flyn includes a water power at Richford and a 50-mile power line. The Clyde River Company has been in the hands of a receiver for some time.

Charleston Deal Approved. — The stockholders of the Charleston Consolidated Railway & Lighting Company, the Charleston Consolidated Railway, Gas & Electric Company, the Charleston-Edison Light & Power Company and the Charleston Gas Light Company have approved the consolidation of these properties into the South Carolina Power Company. This last-named company acquires all the rights and powers of the aforesaid four companies, the stock of which, by agreement, is to be exchanged for stock in the new company. It is part of the plan for control of the South Carolina Power Company to pass to the Southeastern Power & Light Company in accordance with plans announced previously in the ELECTRIC RAILWAY JOURNAL.

Abandonment Hearing Continued.—Hearing on the petition of the receiver of the Detroit United Railway, Detroit, Mich., to discontinue service between Romeo and Imlay City, Mich., has been continued until Feb. 14 by William S. Sayers, Jr., standing master in chancery. A. L. Drum, representing the railway, declared on Dec. 30 the 20-mile line is being operated at an annual loss of $30,000. The plan was opposed by some of the residents affected.

Book Reviews

Mainsprings of Men

By Whiting Williams. New York: Charles Scribner's Sons. 313 pages. $1.50.

Whiting Williams knows his subject. He got much of his material at first hand. Then starting with a bond of sympathy for the worker, he has written a volume that is mighty stimulating. Many of us think we know what we want, but even after we have attained our ambition, few of us know then what to do. As the author points out, we are appreciating as never before the vastness of our human powers and the delicacy of their control. As never before, accordingly, men are searching for the springs of action within themselves and within their fellows—evidently in the belief that the value of a life is measured by its influence upon the thoughts and actions of others.

It is certainly true, on the whole, that teachers and students, statesmen and voters, editors and readers, captains of industry and lieutenants of labor, all are to-day in earnest search of a better understanding of the deeper sources of men's daily doings; between dawn and dusk all these wielders of influence stand or fall according as they secure and direct the physical or the spiritual energies of their fellows. The author saw in the wide-spread urgency of this search the chief warrant of the book's effort to furnish to such seekers a few suggestions capable of daily application. In order to facilitate this practical purpose free use was made of the "case" or "problem" method; wherever possible, a fact or principle is set forth by showing how, in a particular section of human experience, it appeared to operate.

The introduction to the book is confined to a statement of "The Why and the How." The rest of the book is divided into three parts: I. What the worker wants. II. What all of us want. III. Finding what we want in our work. There is the bare outline. It is impossible even to begin to go into the matter of the scope of the contents. To all employers of labor sincere in their desire for a more thorough understanding of this whole problem the book contains many points that should be helpful and much thought-provoking material. It is not merely "just another book on the labor problem," not by any means.

Metropolitan Street Traffic Survey (Chicago)

By Miller McClintock. The Chicago Association of Commerce. 292 pages. $5.

Street traffic studies from the metropolitan standpoint form the basis of Dr. Miller McClintock's report on street traffic survey in Chicago. The report is based on a year's study of actual conditions. It is replete with data, charts and findings made by the corps of investigators. The report contains fifteen chapters divided into two parts, the first presenting the survey data and the second the recommendations indorsed by the Chicago Association of Commerce, under whose auspices the report was made. The report forms the basis for an article which appears elsewhere in this issue of the JOURNAL.

Personenbahnhöfe (Passenger Railway Stations)

By W. Cauer. Berlin: Julius Springer. 306 pages, 142 illustrations. Cloth. 22.50 marks.

This is the second edition of a book first published in 1913. While the contents relate primarily to steam railroad passenger stations, electric railway managers with large terminal or through waiting stations could obtain many suggestions on station layout, arrangement of track, etc. There are a few references to railroad stations in the United States, but the practice described is primarily that of Europe.

American Railway Accounting

Compiled by Elizabeth Cullen, reference librarian Bureau of Railway Economics, Washington, D. C. Railway Accounting Officers Association, Washington, D. C. 52 pages.

This pamphlet is a continuation of bibliography in railway accounting procedure, 1926 edition, and reprinted from "Railway Accounting Procedure," 1927 edition. Part I includes historical matter issued 1925-1926; Part II is a compilation and use of railroad statistics, and Part III concerns depreciation with additional references. The books, documents and periodical articles listed are to be found in public libraries, especially those maintaining special collections on economics and statistics.

The Tired Trolley Car

By Beth A. Retner. Garden City, New York, N. Y.: Doubleday, Page & Company. 1926. 158 pages. Net, $2.

Minnie was weary of working hard and handling over the nickels to Jimmy Jingle. She was tired of Rockaby Street with its bumps and hills, its red-brick houses, graveyard and second-hand animal store. She longed for shops and lights and adventure. Main Street would be the panacea for all her ills. But disillusionment followed close upon the glorious experience. No gentlefolk inhabited Main Street; automobiles "honked," "honked" at her scornfully; none of the shiny-badged policemen seemed glad to see her and a huge moving van came along and bumped her.. "Sirrocco, Mirrocco, if I were only back on Rockaby Street."

Minnie is a tired trolley car who longs for thrills and gets them. She is only one of the many whimsical characters in Mr. Retner's latest contribution to juvenile readers. The others include the Wax Lady in love with the Window Dresser; Lucy Dancing Leg; Billy Tick, the fish, and Adam Applepie.

Boys and girls of the fairy-tale age will undoubtedly have genuine sympathy for Minnie, who longs for patent leather shoes and moon balloons, who is enchanted with the superficial grandeur of the Main Street cars and intrigued by their accounts of theaters, department stores and carrousels. But Mr. Retner would have boys and girls also imbibe some of the wisdom Minnie took on after her escapade. There was happiness in every ride on Rockaby Street. The children actually cheered when they passed the graveyard and when they approached the second-hand animal store, that always bought everything and never sold anything—why, there were goldfish to be had for the buying. And what if the curfew sounded at 8 o'clock, something done "had earned a night's repose."

On first reading the title of this book, "The Tired Trolley Car," it appeared to the reviewer that Mr. Retner, well-known humorist, was joining the unattenuated ranks of transit experts. It seemed as though his thesis were a plea for a new form of transportation, since the electric became jaded. But a book cannot be judged by its title. To the average reader of the ELECTRIC RAILWAY JOURNAL the allegory presented by the author of "That's That" may not be especially informative, but it will serve as another reminder that no planning is sufficiently constructive which does not consider the problems of Rockaby Street as well as those of Main Street.

Political and Industrial Democracy—1776-1926

By W. Jett Lauck. New York: Funk & Wagnalls Company. 374 pages. $2.

Political democracy without corresponding industrial freedom is an anachronism, according to W. Jett Lauck, who traces, in his most recent book, the growth of employee ownership and representation in this country. It is worthy of note that of the very few cases cited by Mr. Lauck as being truly democratic in nature he places the plan of Thomas E. Mitten, head of the Philadelphia Rapid Transit Company, pre-eminently in the vanguard. According to the author, this "men and management" organization represents the most comprehensive plan yet set up to provide for the immediate company enfranchisement of labor and the gradual conversion of labor into capital through acquiring common stock.

Mr. Lauck has in this present work made a thorough investigation into the sundry practical plans adopted by various manufacturing companies, railways, etc., to insure continued harmony between capital and labor. The principles and standards essential to the realization of industrial democracy are applied as measures of these plans; present tendencies are analyzed and future developments forecasted.

The book summarizes the principal features of various outstanding plans and thus provides a deal of actual working information which should make valuable reference material. Mr. Lauck's tone is optimistic throughout. He believes that the experiences of the present have shown very conclusively that industrial warfare is unnecessary to the satisfactory working out of labor's interests. Railway men will find particular interest in the fact that the author credits the most comprehensive and satisfactory of existing plans to an electric railway.

Personal Items

"Taking a Year Off"

After Forty Years of Aggressive Activity H. M. Atkinson, Atlanta Chairman, Plans to Boost Georgia

After 40 years of activity, in which he has devoted himself to building one of Georgia's greatest industrial enterprises, Harry M. Atkinson, chairman of the board of the Georgia Railway & Power Company, is getting out of harness, so far as attention to business details go.

Beginning Jan. 1, 1927, Mr. Atkinson is "taking a year off." This does not mean that Mr. Atkinson is going to drop out of things. It means that Georgia, as a state, is going to benefit or be benefited, for so long as he lives Mr. Atkinson will always be a builder. His conclusion to forego business details means that he will give more of his time to aiding in a great constructive work in the state. Recently Mr. Atkinson was induced to take the chairmanship of the advisory committee of the Georgia Association, in the hope that he can help President Hastings along practical lines with the association's work. This is not a new interest with him by any means, for Mr. Atkinson has been doing these things a number of years. He and his business associates quite a little while ago took an active interest in improvement of agricultural education in the state, and for some time Mr. Atkinson has been close to the efforts made at the state college.

To those who know him well no surprise was occasioned by this latest announcement by the chairman of the board of the Georgia Railway & Power Company. He is an unobtrusive worker, but the value of his contributions to the community has received public recognition before. Just about a year ago he was selected as having contributed in the twelve months then recently ended more of inspired, effective and unselfish work for the betterment of the community of Atlanta, Ga., than any other citizen. To him was awarded the silver loving cup given annually by the *Georgian and Sunday American* for playing the rôle of Atlanta's most valuable citizen in 1925. The committee's selection, according to the announcement, was based on Mr. Atkinson's activities in industrial development of the North Georgia region, of which Atlanta is the center, through great water-power plans, two of which were completed in 1925 and another projected. His efforts to improve transportation facilities in and around Atlanta and his general record of service for the communities and region development were also cited by the committee.

Mr. Atkinson has been identified with nearly all the important electrical projects that have been put through at Atlanta for more than 25 years and has contributed much to the city's growth and prosperity. He was instrumental in consolidating the railways and lighting companies of Atlanta into the Georgia Railway & Electric Company. He also organized the Georgia Railway & Power Company, which began operating in 1912, and became chairman of the board of directors of that company at the time of its organization. This position he has held up to the present time. In addition to electrical enterprises, he organized, built and was the first president of the Atlanta, Birmingham & Atlantic Railroad, a steam property, which has contributed to the development and prosperity of those sections of Georgia and Alabama served by it. Mr. Atkinson has also found time to take an active interest in the cultural and social life of the community.

H. M. Atkinson

E. F. Thayer Joins P.R.T. Staff

Edwin F. Thayer has resigned as assistant editor of the ELECTRIC RAILWAY JOURNAL to enter public relations work with the Philadelphia Rapid Transit Company, Philadelphia, Pa. In this work he will be associated with J. M. Shaw, who as editor of *P.R.T. Service Talks* directs the public relations activities of the company.

During his connection with the JOURNAL, Mr. Thayer has contributed to all departments of the paper, but he engaged more particularly in the preparation of material for the department Manufactures and the Markets. To this work he brought an unusual combination of talents, a combination which, reinforced by his recent contact with the electric railway industry in its various phases, should be very valuable in his new work.

Mr. Thayer is by profession an engineer, but the urge toward journalism and public relations work has long been strong in him. Thus he served with the Pasadena *Star-News* for three years and the Los Angeles *Examiner* for two years. He was graduated from the California Institute of Technology at Pasadena, where he took a five-year course, receiving the degree of B.S. He had more than a year's experience in street contracting work, but turned from engineering as such to become an engineer-editor, activity that contemplated the exercise of his acquired talent as expressed in his engineering studies and his natural talent manifested in the urge to write.

J. H. Hustis Heads Schenectady Railway

The Delaware & Hudson Company and the New York Central Railroad have announced the election of James H. Hustis, formerly chairman of the Boston & Maine Railroad, as president of the Schenectady Railway, which is jointly owned by them.

Mr. Hustis for several years was identified with the New York Central and later became president of the Boston & Maine, from which post he was elevated to the chairmanship which he lately resigned. He succeeds the late E. M. Walker at Schenectady.

R. B. Stearns and K. S. May Members of Banking Firm

Two former railway men have become members of an investment banking house. They are Russell B. Stearns and Kenneth S. May, who on Jan. 1, 1927, were admitted to general partnership in the firm of Arthur Perry & Company, Boston, Mass.

After Russell B. Stearns was graduated from the University of Michigan, class of 1916, he assumed the duties of assistant to the president of the North American Company, New York. He served overseas during the war and then entered the investment banking business in Boston and became associated with the firm of Arthur Perry & Company in November, 1920. He is vice-president and a director of the Municipal Gas Company of Texas. Mr. Stearns will continue to be located in Boston.

Mr. May was in the class of 1909 at the Massachusetts Institute of Technology, taking the electrical engineering course. After leaving college he was successively connected with the Boston & Worcester Street Railway, the Boston Elevated Railway and for some six years with Stone & Webster in the department which conducted examinations of public utility properties for investment bankers. In May, 1916, Mr. May became associated with Arthur Perry & Company, with headquarters in Boston. He is now located in Philadelphia.

L. P. Miles a Publisher

Lovick P. Miles, attorney for the Memphis Street Railway, Memphis, Tenn., was elected president of the Commercial Publishing Company, publishers of the Commercial *Appeal* and the *Evening Appeal*, at a meeting of the directors on Dec. 8. Mr. Miles was the unanimous choice of the board. He has announced his immediate acceptance and retirement from law practice on March 1, 1927, in order to devote his entire time to the duties of his new office. Mr. Miles is one of the most prominent lawyers in the South. He has had newspaper experience and training. He was engaged at one time as assistant attorney of the Missouri Pacific Railway System and later was general attorney for the same system for western Arkansas and Oklahoma.

New Public Service Transportation Unit Heads

Messrs. Warner and Schreiber, Long in Service of New Jersey Company, Are in Charge of Traffic and Plant Respectively—L. P. Baurhenn Director of Personnel—Messrs. Rothery and Sell Promoted

CHANGES in the operating personnel of the Public Service Railway and the Public Service Transportation Company, Newark, N. J., were announced recently by Matthew R. Boylan, vice-president in charge of operation. As indicated previously in the ELECTRIC RAILWAY JOURNAL the purpose is to increase the efficiency of the organization.

A. T. Warner

Arthur T. Warner becomes general manager in charge of traffic. Mr. Warner has been assistant to Vice-President Boylan.

Martin Schreiber becomes general manager in charge of plant. Mr. Schreiber has been manager of the Southern Division.

Louis P. Baurhenn becomes director of personnel. Mr. Baurhenn has been general superintendent.

L. P. Baurhenn

G. A. Rothery

C. L. Sell

George A. Rothery, chief clerk, Camden, succeeds Mr. Schreiber as Southern Division manager and Claude L. Sell, superintendent of employment, Camden, becomes assistant manager.

Mr. Warner was graduated from Lafayette College on June 22, 1910, as an electrical engineer and five days later entered the employ of Public Service Railway as a cadet engineer. He was put to work in the pits at the Newark car shops, and later had experience in other departments of the company. At the end of the two-year course, in 1912, he was assigned to take charge of the traffic department, which was formed at that time. Later he became traffic investigator. He was made traffic engineer on Jan. 1, 1916. He became assistant to Matthew R. Boylan when Mr. Boylan was made acting general manager on Dec. 1, 1923, and continued as his assistant when Mr. Boylan was made vice-president in charge of operation in April, 1924. Mr. Warner is president of the Public Service Section of the American Electric Railway Association and holds important committee places in that organization.

Upon graduating from Ohio State University with the degrees of mechanical and electrical engineer, Mr. Schreiber entered the employ of the Cleveland Electric Railway as an electrician and had risen to the position of engineer in charge of drafting rooms when he resigned in 1903 to become connected with the Public Service as assistant engineer of the railway. Three years later he was made engineer of maintenance of way and later chief engineer for the Public Service Railway and was appointed manager of the Southern Division on Sept. 1, 1920. For sixteen years Mr. Schreiber had charge of the designing and construction of a large number of improvements for Public Service, including carhouses, bridges, ferry slips and ferry houses, sand-drying and stone-crushing plants and commercial buildings. He had charge of the construction of the Public Service Terminal Building in Newark.

After several years of railway experience in New Orleans. Mr. Baurhenn came to New Jersey in 1900 and took a position with the Bergen County Traction Company at Edgewater as general shop foreman in charge of transportation. When the New Jersey & Hudson River Railway & Ferry Company took over the Bergen County Traction Company Mr. Baurhenn became superintendent and purchasing agent of the new company, remaining in that position until 1911. When Public Service took over that company in 1911 Mr. Baurhenn was made division superintendent of Bergen. He was transferred to the Hudson Division as division superintendent in 1915 and two years later went to Essex Division in a similar capacity. In August, 1918, he was made assistant general superintendent and on Dec. 1, 1923, general superintendent.

Martin Schreiber

For the last fourteen years Mr. Rothery has been employed by the Public Service Railway. He started in the inspection department, then went to the general superintendent's office, was chief clerk of Essex Division, and later he was active in special traffic and standardization of carhouse practices, with headquarters at Newark. Since 1920 he has been chief clerk to the manager of Southern Division.

Mr. Sell became connected with the Public Service Railway in 1912 as a motorman. He since has run the gamut of the operating department and has had much to do with the operation and maintenance of buses. Besides, he has been starter, inspector, chief instructor, supervisor of instruction and superintendent of employment.

Obituary

Edwin M. Walker

President of Schenectady Railway a Victim of Monoxide Gas Poisoning —Man of Sterling Qualities

Another name was added to the long list of fatalities attributed to monoxide gas poisoning in the death on Dec. 30 of Edwin M. Walker, president of the Schenectady Railway, Schenectady, N. Y. Apparently he had started to adjust his car, but with the garage doors closed on account of the cold. So it was that the deadly, odorless gas overcame him within a few feet of his unknowing family.

Even the brief mention that the ELECTRIC RAILWAY JOURNAL was able to print at the moment of going to press with the Jan. 1 issue sufficed to prove that Edwin M. Walker had made a host of friends in the industry which he had helped so much to lead to higher ideals. It seemed incredible to them that one still in the flush of his powers and the bounding health of a clean-living man should have been taken away so suddenly.

Those who know the rough and tumble through which many a public utility man has to pass never ceased to admire the scholarly refinement that was always a part of Edwin M. Walker. Whether he was dealing with the employees or the most unreasonable agents of the public, a coarse word never passed his lips. His unmistakable sincerity and faithful performance of any promise made were the weapons that brought him victory without lowering his personality.

Indeed, Edwin M. Walker had inherited from his forebears the finest qualities of the cultured Englishman. His life was the embodiment of Polonius' advice: "Be thou familiar, but by no means vulgar." His charm and tact were felt by men of every degree of education.

These qualities stood him in good stead, for he was ever in the forefront of the struggle for modernizing the electric railway industry. Pioneers have exceptional need of an amiable disposition to make the bitterness of a new idea palatable. Edwin M. Walker had just the right combination of brains, patience and kindliness.

Mr. Walker is best known through his splendid work with the safety car at Terre Haute at a time when the safety car was anathema to most of the field. It was his doctrine that the street railway must take advantage of all technical improvements to give a higher standard of service to a more exacting public. Starting in 1918 with his first safety cars, he soon wiped out most of the jitneys with a railway service much better than they offered and at a fare no higher than 5 cents. Mr. Walker left Terre Haute in 1923, but the fare there remains unchanged, largely because of the extent to which the service has been merchandised.

It is less widely known that he was also a pioneer with the bus. As long ago as September, 1914, when he was manager of what is now the Dubuque Electric Company, Dubuque, Iowa, he installed some improvised Ford buses and later used Edison-cell buses for a bridge operation to East Dubuque. During his stay at Schenectady Mr. Walker also applied for certain bus franchises. From the vantage point of ten years' clear-sighted study, he refused to be swept away by propaganda or hysteria on the matter of car versus bus. For him there was no "versus"; only an "and" to care for conditions where trackways were impracticable or where there was no market for real mass transportation.

E. M. Walker

When he went to Schenectady, late in 1923, it was to accept a most difficult task. A strike had left the company impoverished. Maintenance had been deferred. Much of the rolling stock was antiquated or too heavy. Finally the directors of the two steam railroads which were equal owners of the property assumed a somewhat "defeatist" attitude about electric railways; in other words, they were not sure.

The man who had been chosen to assume the post at Schenectady was equal to the task. Month after month saw an improvement in the reliability of the equipment, and with that improvement came increases in riding and decreases in expenses per car-mile.

It was in this connection that Edwin M. Walker showed his flair for the right kind of publicity. The winter before his advent had seen a complete breakdown of the service in a snowstorm. So his first thought was to guard against any possible repetition of the kind. However, it was not enough only for his men to know that they would be prepared. He wanted the public to know it, too. No space was bought to advertise "We're ready to clean up Old Boreas." Instead, the completely rehabilitated and enlarged snow-fighting equipment was lined up alongside the shops where the thousands of General Electric workers could see for themselves that this time it would be safe to jack up their autos for the winter.

Although Mr. Walker succeeded in securing funds for only part of the new rolling stock he considered essential the new vehicles amply justified their purchase. Shortly before his death, however, he had made recommendations for a modernization program which he firmly believed would make the property at Schenectady one of the finest and most profitable of its size in the country.

Mr. Walker was born at Worksop, England, in 1875. At the age of twelve he came to the United States with his parents. Following a technical education, ever broadened by his love for good literature, he entered the public utility field. After holding positions in gas and electric work at Lockport, Boston and elsewhere, he took charge of the railway and electric property at Dubuque. Next he spent six years to 1923 at Terre Haute, following which he accepted the presidency of the Schenectady Railway.

Hardly the least of Edwin M. Walker's fine qualities was his willingness to give freely of his experience to fellow-craftsmen. He was a hard worker in his territorial bodies and the American Electric Railway Association, a faithful correspondent and a painstaking host. The electric railway industry can never have too many men of his stamp.

F. Harrison Warner, general agent at Greenfield, Ind., for the Terre Haute, Indianapolis & Eastern Traction Company, died recently. He was 60 years old.

Charles Page, Sand Springs, Okla., builder of electric railways and promoter of other utility enterprises, died on Dec. 28.

William T. Fitch, for many years superintendent of the maintenance of way department of the Philadelphia Rapid Transit Company, Philadelphia, Pa., is dead.

Samuel M. Clement, former public service commissioner of Pennsylvania, died in Philadelphia on Dec. 21 of injuries received in a recent taxicab accident. Mr. Clement was president of the Quaker City Cab Company and a director of several local trust and insurance companies. He was 53 years old.

Charles Elmer Gossard, superintendent of the Lewistown & Reedsville Electric Railway, Lewistown, Pa., for 24 years, died on Dec. 28. Mr. Gossard was born at State Line, Franklin County, Pennsylvania. The early years of his life he spent at Altoona. He went to Lewistown 26 years ago and entered electric street railway service there. The late superintendent was 57 years old.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

General Electric Adopts Relief and Loan Plan

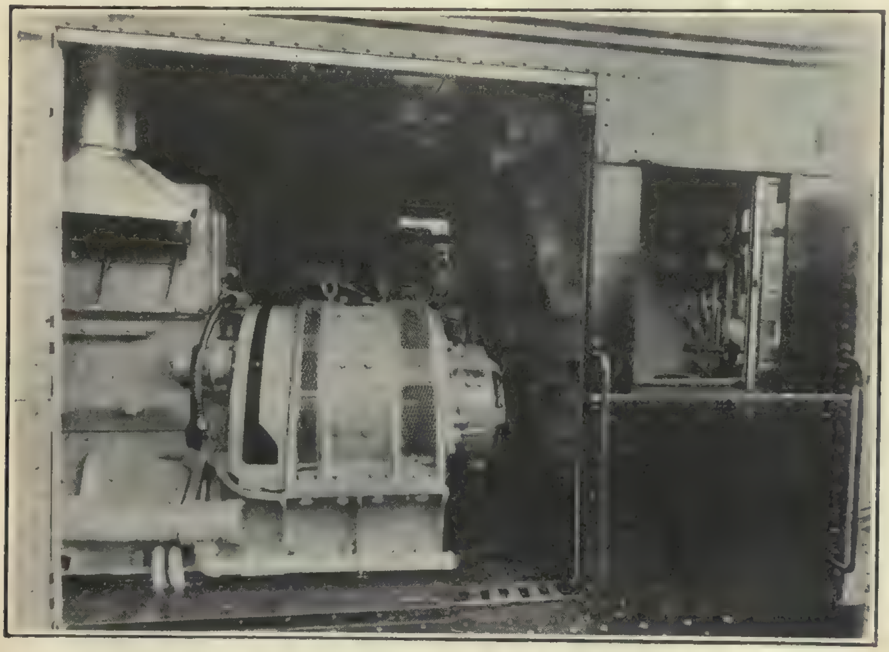
A relief and loan plan whereby employees of the General Electric Company who are temporarily idle, working part time or in need of relief because of illness in the family or other emergencies in the home can borrow up to $200, without interest, and repay it by deduction in installments of 10 per cent of weekly pay when back on full time again has been inaugurated at the Schenectady, N. Y., works of the company.

This plan originated among the employees and was presented to the company through the works council some time ago. The employees were told then that if a majority in the employ of the company for one year or more wanted the plan it would not only be adopted but that for every dollar put into the relief and loan fund treasury by the employees the company would put in an additional dollar.

Any employee with the company more than one year is eligible for membership. Fifty cents a month is deducted from each member's pay, 5 cents going into a relief fund and 45 cents to be used as an unemployment loan fund.

The General Electric Company will act as custodian of the fund and will allow 5 per cent interest thereon. Employee members retired either on a pension or disability relief will be paid the full amount deducted from their wages plus interest at 5 per cent per annum for the average time. Members who leave the employ of the company after one year's membership will be refunded the amount deducted from wages less the amount contributed toward the supplementary relief fund.

All loans and disbursements will be administered by a committee composed of an equal representation of employees elected by the contributors and appointed by the works management.



Engine-Room Layout of New Gas-Electric Cars for Lehigh Valley Railroad. View Is of Right Side of Car, Showing Generator, Blower Motors, Instrument Boards and Controls

Lehigh Valley Orders Four Double-Unit Gas-Electric Cars

A recent order for additional motive power placed by the Lehigh Valley Railroad includes four Brill-Westinghouse double-unit gas-electric cars for operation on the stiff grades from Elmira to Canastota and between Wilkes-Barre and Towanda. On these lines grades of 1 and 1.5 per cent are common, while the most severe one is 2.4 per cent for 3.6 miles.

While the floor plans of the cars differ, the exterior dimensions and general characteristics will be the same. Each car will be 70 ft. 6 in. over all and will weigh between 130,000 and 135,000 lb., depending upon the interior arrangement. A compartment 13 ft. 10 in. long at the front of the car will house the power plant, fans, control apparatus and operator's cab. Each of the two power plants will consist of a 250-hp. Brill-Westinghouse engine, driving a 160-kw. Westinghouse generator through a flexible coupling. There will be four 140-hp. type 557-D-8 motors to each car, two fed from each generator. Controls will be of the unit switch type, arranged for single-end operation. Two motor-driven air compressors, each having a displacement of 25 cu.ft. at the rated voltage, are to operate the brakes and controls, and two fans rated at 1,500 r.p.m. have been specified as part of the cooling equipment. The power plants are to be mounted longitudinally and spaced 4 ft. 5 in. center to center, which will permit free access to either side of either unit, as well as providing ample room for an aisle. The cars will replace six regular trains.

Jobber's Status Discussed

Head of Electric Hose & Rubber Company Makes an Exhaustive Survey of Situation as It Affects Industry

Feeling that the jobber's present status in industry needs a thorough discussion, C. D. Garretson, president of the Electric Hose & Rubber Company, Wilmington, Del., has just prepared a frank and comprehensive study of the subject, which is published in a handsome brochure, entitled "Thinking Thru."

While Mr. Garretson is far from predicting that the position of the jobber is without hope, he likens him to "a weathervane in a cyclone." "He is," continues the author, "grabbing at any line to sell on which he can make money. His full line is a regular hodgepodge, from steel bullets to toothbrushes and from radios to rubber bands. If he looks this condition right square in the face and thinks about it, he will realize that it is not an economical position for him to be in, because of the fact that he is carrying a lot more inventory than he should for the amount of his sales, and, more still, he cannot give the attention to each individual item that it deserves.

"Wouldn't it be better to bring his line down to the number of items to which a jobber can give adequate representation, get his business on a stable basis and make room for other jobbers in the line which he discards?" asks Mr. Garretson. "This intensive competition does not make any more business. It is simply changing the channels in which business should economically flow. A jobber who really adds on lines with the thought that he is going to get more business cannot help but spread his efforts thinner, and eventually he pays the price for this greed."

"Thinking Thru" not only contains such arguments as these but is the medium for presenting the business policies of the Electric Hose & Rubber Company in a very human manner. The booklet is now being distributed to the trade.

Brown Boveri Has Good Year

Laurence R. Wilder, president of the American Brown Boveri Electric Corporation, reports a successful year for his corporation. Gross business of the company and its subsidiaries in 1926 is estimated by him at approximately $25,000,000. For 1927 Mr. Wilder predicts a gross of some $35,000,000, this estimate being based on business done and in sight.

Careful Attention Paid to Interior Appearance of Williamsport Cars

Emphasizing the elements of lightness in weight and flexibility of operation five one-man, two-man cars were recently delivered to the Williamsport Passenger Railway of Williamsport, Pa., by the J. G. Brill Company of Philadelphia, Pa. The interior appearance of these cars is particularly pleasing, Brill seats with brown leather upholstering being standard equipment, while the motorman's operating equipment is inclosed by wood paneling. A large full-vision hinged type of windshield has been installed at either end.

Roomy Interior of Williamsport Passenger Railway's New Cars

Principal specifications of the new units are appended here:

Date order was placed	July 8, 1926
Date of delivery	November, 1926
Seating capacity	44
Weight:	
Car body	19,460 lb.
Trucks	9,600 lb.
Equipment	9,820 lb.
Total	38,880 lb.
Bolster centers, length	19 ft. 8 in.
Length over all	42 ft. 2 in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 8 in.
Height, rail to trolley base	10 ft. 10½ in.
Body	Semi-steel
Interior trim	Statuary bronze
Headlining	Agasote
Roof	Arch
Air brakes	Westinghouse
Axles	To A. S. T. M. specification
Bumpers	Hedley anti-climber (four-ribbed)
Car signal system	Faraday
Car trimmings	Statuary bronze
Center and side bearings	4 ft. 3¼ in.
Conduits and junction boxes	Brill
Control	K-35
Destination signs	Electric Service Supply 129LR
Door operating mechanism	National Pneumatic
Fare boxes	Johnson type DM-2
Finish	R. F. Johnson's "Krakno"
Gears and pinions	Tool Steel Gear & Pinion Co.
Hand brakes	National Staffless
Heater equipment	Railway Utility Co. cross seat type, 750-watt
Headlights	"Golden Glow" type RRc-96
Journal boxes	MCB 3¾ x 7 in.
Motors	Four Westinghouse No. 510-A, inside hung
Sanders	Keystone
Sash fixtures	Brill
Seats	Brill No. 201-B
Seating material	Genuine leather
Slack adjuster	National Brake Co. type E
Springs	Brill
Step tread	Kass, 5 in.
Trolley catchers	Earll
Trolley base	Nuttall No. 20-A
Trolley wheels	VK-6
Trucks	Brill No. 177-E-1
Ventilators	Railway Utility Co.
Wheels	26 in. diameter

Visiting Inspection Committee from Williamsport Ready to View New Equipment at Brill Plant

Rubber Exchange Announces New Rule

A new rule providing that trading in the current months shall stop at noon of the last trading day upon which transferable notes may be issued for delivery went into operation on the Rubber Exchange of New York Dec. 27. Explaining the new ruling, Secretary Walter Dutton has issued the following statement:

"Transferable notes may be issued up to 12:15 p.m. of the last trading day. This extension of time applies to notices issued against open conditions with the clearing house and also provides for issuing notices against sales made on the last trading day of the current day for delivery on the last day of that month.

"In the latter instance, clearing members may issue transferable notices for such deliveries before 12:15 p.m. on the last trading day, which notices should be issued direct to the clearing members, clearing the purchase, instead of to the clearing house. Such transferable notes must be passed on within a half hour and circulate until the interest in such month is liquidated, not later than 7 p.m. on the date of issue."

25 Noiseless Cars for Twin Cities

Included in the budget of the Twin City Rapid Transit Company, Minneapolis, Minn., is $155,000 for 25 of the new type noiseless cars to be built in 1927. In addition $82,000 is set aside for repair and renewal of old cars. These plans are before the Councils of the two cities of St. Paul and Minneapolis, Minn.

Each of the new cars will weigh about 1,000 lb. more than the original type put into operation four years ago on Nicollet Avenue in Minneapolis, but 11,000 lb. less than the old type of cars in use many years. The proposed cars are similar to those in use for a year on the Bryant and Johnson line in rush hours and tried out on the Nicollet Avenue and the Fourth Avenue routes.

Approval of the plan means 60 per cent will be charged to Minneapolis and 40 per cent to St. Paul operation. For instance, $93,000 would be part of the $680,000 budget for the Minneapolis Street Railway for 1927 improvements.

Extensive Improvement Work in Altoona in 1926

The sum of $726,000 has been expended by the Altoona & Logan Valley Electric Railway and its subsidiary, the Logan Valley Bus Company, Altoona, Pa., during the past year, according to a financial statement submitted by C. A. Brooks, supervisor of railways for the General Engineering & Management Corporation, operating the local lines.

Replacing trackage in the city and on suburban lines cost a total of $311,455. Thirteen new cars were purchased at a cost of $221,714. Equipping cars with safety devices cost $37,000. Buses and bus equipment cost $53,000. Repairs and building construction cost $85,337. The company spent $45,000 for rearranging the power feeders and turning over the power contract to the Penn Central Company, Altoona. Since the Fitkin interests assumed charge of the Altoona lines in March, 1925, practically every route has been rebuilt with heavier rails.

Westinghouse Subsidiaries Merged Into Parent Company

Westinghouse Electric & Manufacturing Company announces the discontinuance of the corporate form of two subsidiaries by consolidation into the parent company. These concerns are the Westinghouse Electric & Products Company of Mansfield, Ohio, and the George Cutter Company of South Bend, Ind. In future they will be designated as the Mansfield works and the street lighting department, respectively, of the Westinghouse Electric & Manufacturing Company. The latter includes the South Bend works, which is one of the largest in the country devoted to the manufacture of street lighting equipment, with branches for the manufacture of poles located in Milwaukee, St. Louis, and Valdosta, Ga.

Long Island Railroad Opens New Double-Track Line

Officials of the Long Island Railroad announced the completion on Jan. 5 of double track on the Long Beach Division between East Rockaway and Wreck Lead, a distance of 3.37 miles. The work involved laying a complete single track and, in addition, 150-lb. third rail. The project cost approximately $500,000. Power for the line is being supplied from the existing substations at Wreck Lead and Lynbrook. Service was commenced immediately following the announcement.

General Electric Recalls G. E. Emmons

At a recent meeting of the board of directors of the General Electric Company, G. E. Emmons, for many years in charge of the manufacturing organization and since 1924 retired, was elected acting vice-president, due to the illness of F. C. Pratt. In addition to being in charge of the manufacturing organization, Mr. Emmons was for years Schenectady works manager. At the same meeting E. W. Allen, formerly manager of engineering, was elected vice-president in charge of that activity. The promotions were effected as of Jan. 1.

Rolling Stock

Hamilton Street Railway, Hamilton, Ont., Canada, expects delivery in May, 1927, of 24 single-end, semi-convertible street cars, ordered Nov. 12 from the National Steel Car Corporation, Ltd., also of Hamilton. The units will be of semi-steel construction, steel frames and steel girder plates for the inside side finish being specified, while the outside sheathing below the windows will be of ¼-in. Plymetl. Seats for 48 passengers will be provided, these to be upholstered in genuine Spanish leather. Following are the principal specifications:

Weights:	
Car body	19,000 lb
Trucks	8,000 lb.
Equipment	7,000 lb.
Total	34,000 lb.
Bolster centers, length	18 ft. 2 in.
Length over all	40 ft. 11 in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 3¼ in.
Height, rail to trolley base	10 ft. 9¾ in
Body	Semi-steel
Interior trim	Cherry
Headlining	Haskelite
Roof	Arch
Air brakes	Westinghouse
Axles	4-in. steel
Bumpers	Anti-climber
Car signal system	Consolidated Car Heating Co.
Center and side bearings	Perry-Hartman ball bearings
Compressors	Westinghouse
Control	K-35
Couplers	Emergency
Destination signs	Hunter
Door-operating mechanism	National Pneumatic Co.
Fare boxes	Cleveland
Fenders	H-B life guard
Gears and pinions	Helical
Hand brakes	Peacock Staffless
Heater equipment	Consoliated Car Heating Co.
Headlights	Golden Glow
Journal bearings	Friction
Journal boxes	MCB
Lightning arresters	Westinghouse
Motors	510-A-2 Westinghouse interpole, inside hung
Paint	Duco
Sanders	O. W. Meissner's
Sash fixtures	O. M. Edwards
Seats	Ottawa Car Company
Seating material	Spanish leather
Slack adjuster	Westinghouse
Springs	Coil and elliptic
Step treads	Irving Subway
Trolley catcher	Ohio Brass
Trolley base	U. S. No. 13
Trucks	National Steel Car
Ventilators	Nichols-Lintern
Wheels	26-in. rolled steel
Special devices, etc.	Westinghouse treadle step, automatic air control

Philadelphia, Pa. — Westinghouse Electric & Manufacturing Company was recently awarded two contracts for electrical equipment for the Broad Street subway cars, aggregating $1,182,148. Twenty of the 312 car motors included in the contract must be delivered by April 30 and all must be turned over to the J. G. Brill Company by Sept. 15. Incidentally, Director Ehlers of City Transit expects that the subway will be officially opened by Mayor Kendrick early in November.

Indianapolis, Ind.—Arthur W. Brady, president of the Union Traction Company, recently outlined before the Public Service Commission plans for the purchase of new rolling stock to be used in the company's freight business. Mr. Brady sought the commission's approval of a proposed issue of $62,235 in notes to buy twenty new freight cars. The purchase is to be made on the basis of a $6,000 payment and the balance in monthly installments of $1,035.27.

New York City.—The New York Railways is planning the rehabilitation of 115 cars. They will be rebuilt along the lines of the trial cars concerning which articles have already appeared in the JOURNAL.

Union Traction Company of Indiana, Anderson, Ind., according to reports, has requested permission from the Public Service Commission for the issuance of notes to buy twenty new trail freight cars for $68,235. Terms of the proposed purchase are said to be $6,000 cash and the balance in 60 monthly installments.

Trade Notes

Elisha Walker, president and chairman of the board of Blair & Company, New York City, has been elected a director of the American Brown Boveri Electric Corporation, to fill a vacancy, and Henry Lockhart, Jr., vice-president of the same company, has been elected to succeed Felix Jenkins, resigned.

Service Motors, Inc., Wabash, Ind., will be amalgamated with the Commerce Motor Truck Company of Ypsilanti, Mich., for the purpose of manufacturing buses and trucks to be equipped with the new type of final drive known as the relay axle drive. E. W. Bassick of Bridgeport, Conn., with several associates, has been active in effecting the amalgamation. G. L. Gillam, president of Service Motors, Inc., will be an officer of the new corporation and have active charge of the operation of the business. W. R. Bassick, president of the Commerce Truck Company, will be an officer and director of the corporation and will be actively interested in the new business. M. A. Holmes, for a number of years sales manager of the Republic Truck Company and now sales manager of the Commerce Truck Comnany, will be in charge of sales. The headquarters of the new corporation will be at the service plant at Wabash, which is one of the best designed truck manufacturing plants in the country.

Samuel M. Vauclain, president of the Baldwin Locomotive Works, looks for modest business in 1927, with operations running to 50 per cent of capacity. He expects all departments will be moved to Eddystone, Pa., by the end of 1927 and again denies the report that negotiations are under way for the sale of the Philadelphia property. Gross sales of 1926 are estimated at $47,000,000, against $27,876,064 in 1925.

Metal, Coal and Material Prices

Metals—New York	Jan. 4, 1927
Copper, electrolytic, cents per lb.	12.90
Copper wire, cents per lb.	15.25
Lead, cents per lb.	7.725
Zinc, cents per lb.	7.25
Tin, Straits, cents per lb.	66.75
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, HamptonM Roads, gross tons	$5.125
Somerset mine run, Boston, net tons	2.45
Pittsburgh mine run, Pittsburgh, net tons	2.125
Franklin, Ill., screenings, Chicago, net tons	1.875
Central Ill., screenings, Chicago, net tons	1.425
Kansas screenings, Kansas City, net tons	2.35
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.00
Weatherproof wire base, N. Y., cents per lb.	17.50
Cement, Chicago net prices, without bags	2.10
Linseed oil :5-bbl. lots;, N. Y., cents per lb.	10.8
White lead in oil :100-lb. keg;, N. Y., cents per lb.	14.50
Turpentine :bbl. lots;, N. Y., per gal.	$0.89

New Advertising Literature

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued folder 4474, describing the babbitting of bearings and explaining the use of the Westinghouse automatic electric babbitting pots. The folder describes also the lead base babbitt, alloy No. 25, a product of the Westinghouse company.

Ohio Brass Company, Mansfield, Ohio, in a recent circular announces a new welding device, designated as the O-B portable resistance welder. The device is of unit type construction and specially designed to operate at high temperatures, with repeated heating and cooling, and without any injurious effects.

Armco Culvert & Flume Manufacturers' Association, Middletown, Ohio, has published a bulletin entitled "Applying Culvert Simplicity to Highway and Railway Bridge Problems." This booklet discusses various angles of culvert and bridge construction and points out the simplicity with which installations of large diameter Armco culverts to the crossing of small streams may be made. Various types of stream crossings and drainage problems are discussed and a table is included to assist in determining the size of culvert required in any given case. Copies of the booklet may be obtained from the Armco association.

Peacock Staffless Brakes

The Peacock Staffless Brake is at least three times as powerful as any ordinary type hand brake and provides ample space to wind up all the chain without jamming or binding. Excess of slack cannot put it out of commission.

The Peacock Staffless Brake is designed to occupy minimum platform space as it projects only six inches into the vestibule from the dash. Motormen like the Peacock Staffless because it is easy to understand, simple to operate and always dependable.

Most leading roads are now demanding the Peacock Staffless on both single and double truck safeties.

Write for full details

National Brake Co., Inc.

890 Ellicott Square, Buffalo, N. Y.

Canadian Representative

Lyman Tube & Supply Company, Limited, Montreal, Canada

Engineered To Do Your Work

Gripping securely on slippery pavements—running on schedule even under adverse weather conditions—cushioning the chassis, engine and passengers over rough places—such performances all have a place in the every day work of Firestone Gum-Dipped Tires.

Traction and flexibility are scientifically engineered into these tires, just as long mileage is assured by the extra Gum-Dipping process.

You can depend upon the Firestone Dealer—not only for the "Better Service" which goes with these better tires, but for the economy, safety and comfort that only Gum-Dipped Tires can give.

MOST MILES PER DOLLAR

Firestone

GUM-DIPPED TIRES

AMERICANS SHOULD PRODUCE THEIR OWN RUBBER Harvey S. Firestone

Bus Patrons Demand Luxurious Equipment

$5300
F. O. B. FACTORY

Comfort, Beauty, Luxury and Power are found in this Studebaker Side Entrance Parlor Car for Eighteen Passengers

FACTS prove that Studebaker busses are best adapted to profitable city or interurban service.

First, is the low initial cost proved by the fact that two Studebaker busses can be bought for the price of one heavy truck type bus.

Second, is the lower operating cost which is seven to nine cents a mile less for a Studebaker bus than for heavy truck type bus.

Third, is the marked preference shown by bus patrons for vehicles possessing easy-riding qualities and attractive appearance. Passengers gravitate toward Studebaker busses because of the luxurious seats, generous leg room, wide vision windows and because Studebaker busses have a reputation for maintaining their schedules.

The superlative riding qualities of Studebaker busses is the best assurance of continued patronage which means continued profits for the operator.

With the most powerful bus chassis of its size and weight, Studebaker busses glide quietly along the highway, taking long steep grades in high, with a smoothness attainable only by an accurately balanced six-cylinder power plant in which vibration is practically eliminated. The long, resilient springs and the oversize tires cushion every road shock. The smooth acting four-wheel hydraulic brakes enable the driver to thread heavy traffic or, on the open road, to travel at permitted speeds with reassuring safety.

Lower

—first cost
—operating cost
—maintenance cost
—depreciation cost

Six Body Designs, 12 to 21 Passengers $3935 to $6150

Prices f. o. b. factory, covering body and chassis, complete. Purchase can be arranged on a liberal Budget Payment Plan—Small down payment and balance in convenient monthly installments.

12-Pass. (including driver) cross-seat Sedan-Type	$3935
15-Pass. (including driver) cross-seat Sedan-Type	$4295
18-Pass. (including driver) side-entrance Parlor Car	$5300
19-Pass. (including driver) cross-seat Sedan-Type	$5050
20-Pass. (including driver) Parlor-Car De Luxe*	$6150
21-Pass. Pay-As-You-Enter Street-Car Type*	$5125

*Includes dual rear wheels

Completely Equipped

There is nothing to buy that will add to the driving comfort or facilitate the operation of this bus. The equipment is complete and includes: stop signal system; illuminated destination sign (above windshield); automatic windshield cleaner; rear-view mirror; front and rear bumpers; motometer; extra wheel with tire, tube and cover, mounted on left front; 8-day clock and gasoline gauge, plus the usual instruments, mounted in an oval group under glass; inspection lamp with 10-foot cord. Lights are controlled by a steering wheel switch.

Most Powerful Bus Chassis of Its Size and Weight

Based on the rating of the Society of Automotive Engineers, the Studebaker bus chassis is the most powerful of its size and weight in the world. There are 66 bus chassis on the market with more weight per horsepower than the Studebaker chassis.

The chassis is sturdily built, with surplus strength. It is not a heavy truck-type chassis—nor a passenger car chassis which has been lengthened and therefore weakened by splicing. Extra safety factors include: staunch frame braced by eight stout cross-members; large rear axle shaft; oversize propeller shaft; sturdy, resilient springs; special disc bus wheels and four-wheel hydraulic brakes.

As proved by nearly 300 Studebaker busses with records of more than 100,000 miles, this chassis gives literally scores of thousands of miles of thoroughly dependable service at exceptionally low operating cost—and minimum depreciation.

THE STUDEBAKER CORPORATION OF AMERICA
Dept. B, South Bend, Ind.
Send me full information on Studebaker Busses without obligation

Name..

Address..

City.. State......................

We have..busses at present.

Check below the Studebaker Bus about which you desire information.

Type: Sedan..................Parlor Car..............Street-Car Type...........

Capacity:..Passengers.

Appraising Versus Engineering

Engineering, the design, construction and operation of property, deals with physical units and mechanical forces. Appraising treats of property in relation to its utility and value. These are dissimilar activities, requiring different experience, personnel, resources and methods.

◆

The American Appraisal Company does not design, build, manage, operate, finance, buy or sell property.

◆

For thirty years it has specialized exclusively in studying property in relation to its utility and value. We believe that this specialization has resulted in a more perfect appraisal service than had we dissipated our energies over a wider range of endeavor.

◆

We know that as in engineering there can be no compromise with the inexorable laws of stress and strain, in appraising there can be no compromise with the basic principles of valuation.

◆

This singleness of purpose and focusing of energy upon the making of appraisals account, we believe, to a large extent for the recognition everywhere accorded American Appraisals.

The American Appraisal Company

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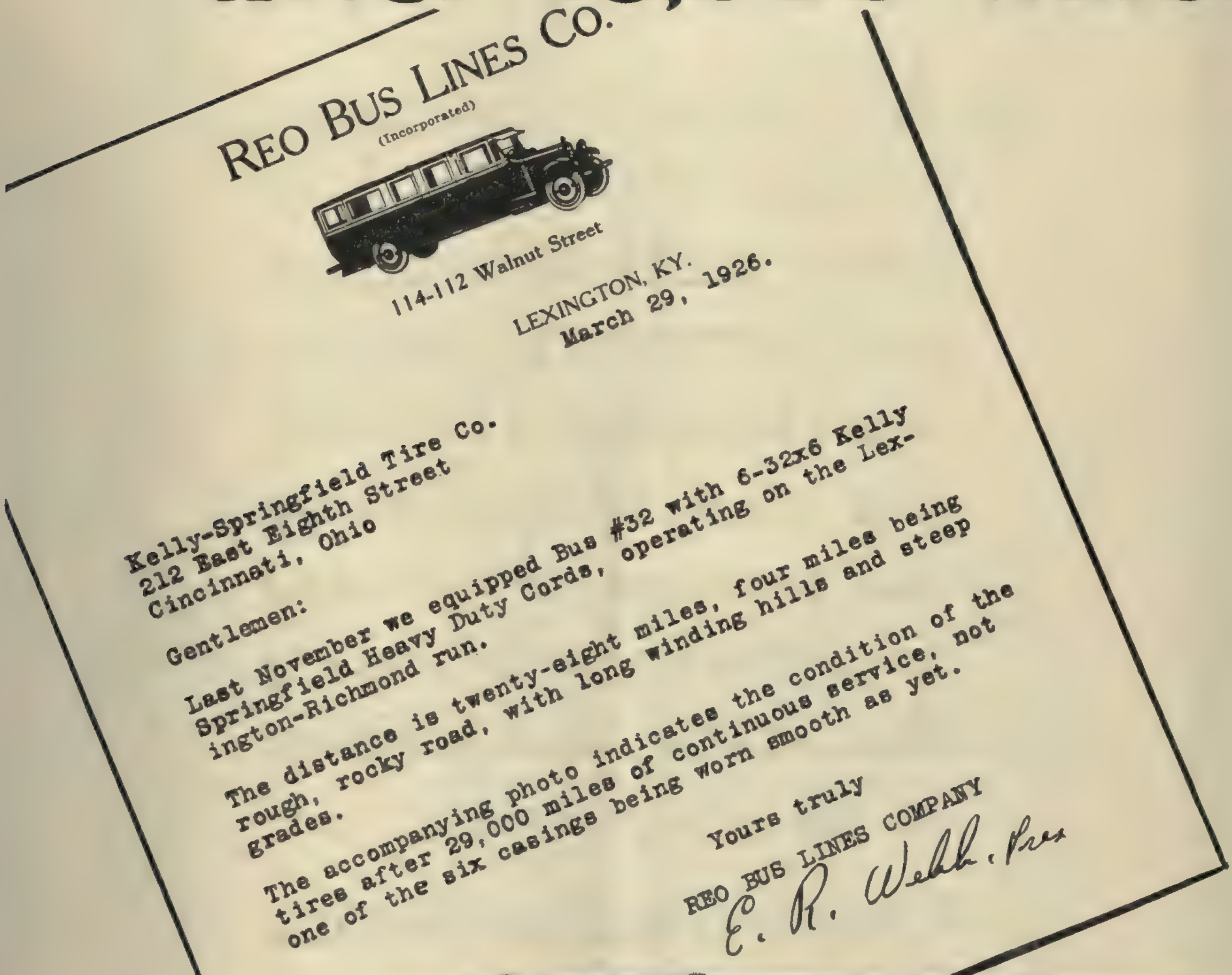
PUBLIC UTILITIES · INDUSTRIALS · REAL ESTATE PROPERTIES · NATURAL RESOURCES

A NATIONAL ORGANIZATION

Tread still good after 29,000 miles



REO BUS LINES CO.
(Incorporated)
114-112 Walnut Street
LEXINGTON, KY.

March 29, 1926.

Kelly-Springfield Tire Co.
212 East Eighth Street
Cincinnati, Ohio

Gentlemen:

Last November we equipped Bus #32 with 6-32x6 Kelly Springfield Heavy Duty Cords, operating on the Lexington-Richmond run.

The distance is twenty-eight miles, four miles being rough, rocky road, with long winding hills and steep grades.

The accompanying photo indicates the condition of the tires after 29,000 miles of continuous service, not one of the six casings being worn smooth as yet.

Yours truly
REO BUS LINES COMPANY
E. R. Webb, Pres

KELLY HEAVY DUTY CORD

An increasingly large portion of the actual income derived from car card advertising service must be devoted to building and maintaining the prestige of car card advertising in the face of the active competition of all other media.

Creating and protecting our mutual interest is a costly item.

Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

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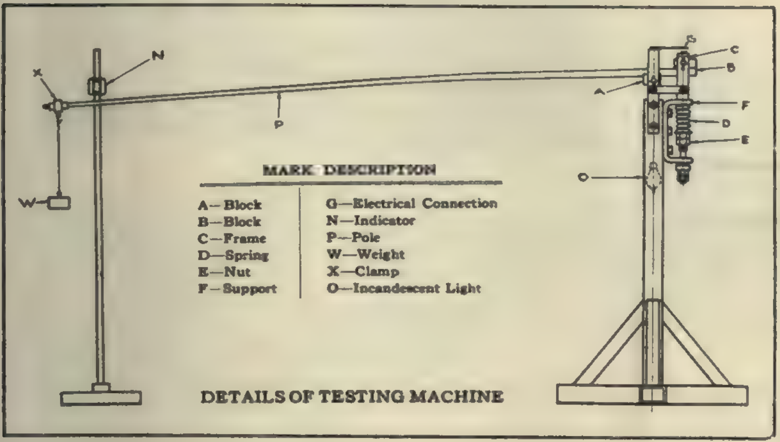
TROLLEY POLES



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A TEST, approximating service conditions, is applied to every standard "NATIONAL-SHELBY" Trolley Pole before it leaves the mill. This test is made on an improved testing machine which infallibly indicates the presence of a permanent "set" in the pole, or any imperfections which would impair its usefulness.

The base of the pole is set horizontally in the machine, after which a deflection gage is set, corresponding to the height, from the floor line, of the free end of the pole under no load.

The proper weight for the pole being tested is then hung on the free end of the pole, and an electrical contact is set so that when the pole is loaded it will close the current of an electric light.

After this adjustment is made, the weight is removed and the return of the pole is checked with the deflection gage. Any pole that does not return to its original position is rejected. A booklet, giving other facts about "NATIONAL-SHELBY" Trolley Poles, sent on request.

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Frick Building, Pittsburgh, Pa.

DISTRICT SALES OFFICES IN THE LARGER CITIES

Whatever your requirements

specify

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They talk for themselves

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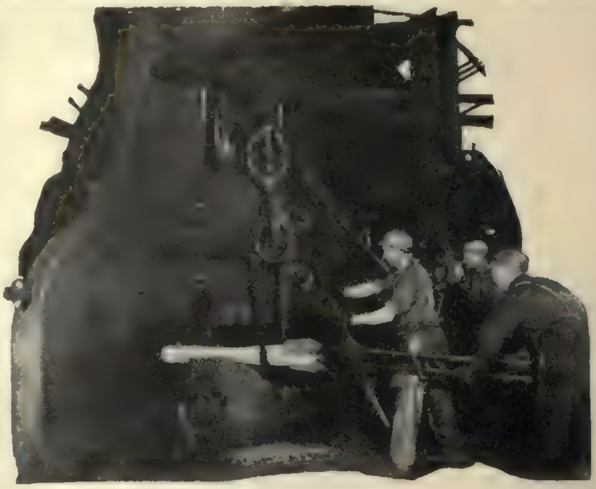

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MORE than sixty years of experience in the manufacture of axles, coupled with every facility for correct heat treatment and accurate testing, insure the meeting of the specification in the finished product.

Prompt deliveries of Car and Tender Axles, Engine Truck and Driving Axles, Electric Motor and Street Car Axles, Miscellaneous Forgings.

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1835

ELECTRIC
REFRIGERATION
FOR CARS

*Automatic
—reliable*

A Phoenix Electric Refrigerator Car goes on a trip with no attendant in the machinery room and with the door of this room locked. The refrigerating unit needs no attention from the train crew whatever. Controlled entirely by the thermostat inside the refrigerating room, it keeps the interior of the car within narrow limits of any predetermined temperature.

Many other advantages are afforded by Phoenix Electric Refrigerator Cars. Write for particulars.

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THE PHOENIX
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PANTASOTE
Trade Mark
Seat and Curtain Materials
There is no substitute for Pantasote

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Roofing—Headlining—Wainscoting
The only homogeneous panel board

*standard
for electric railway cars
and motor buses*

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At 46th 250 Park Avenue Street
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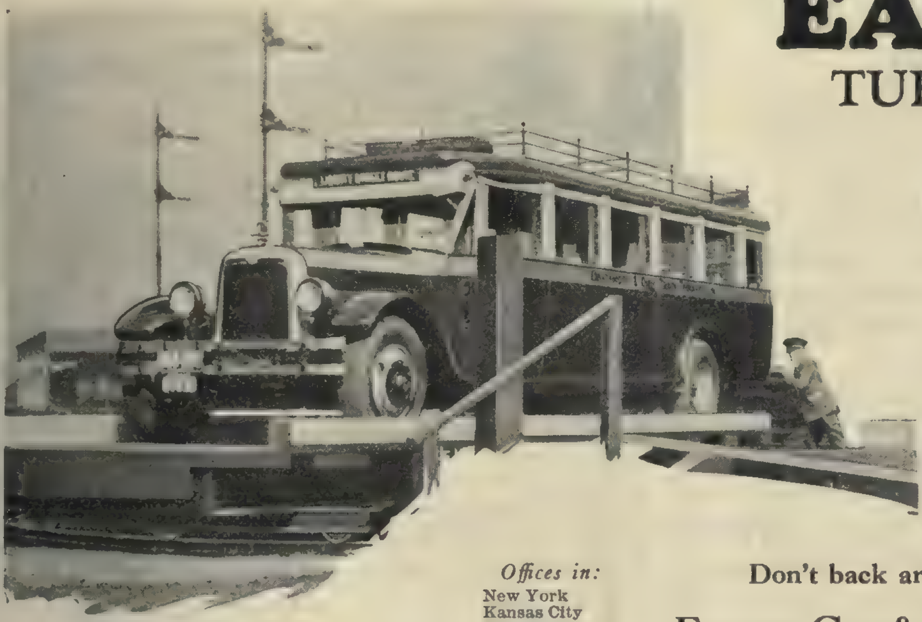
You can save
Garage Space!

Get the maximum use of garage and car house floor space. No new buildings or additions to old ones necessary. This can be done by the installation of

EASTON
TURNTABLES



Easton turntable at the Communipaw Terminal, B. & O. R.R.

Their installation is advantageous in many places—in saving valuable floor space—in saving time and labor—in expediting garage and shop servicing facilities—as a combined turntable and bus washing platform—and many others. They are easily turned by one man. Their installation cost is low and maintenance practically nil—at most a few cents for lubrication.

Offices in:
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Don't back around—*turn* around.

EASTON CAR & CONSTRUCTION CO.
Easton, Pa.

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Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper
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Sales Representatives in the Principal Cities

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131 State St. BOSTON

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GENUINE BARRETT LIFTING JACKS FOR EVERY PURPOSE
TRADE MARK
STRENGTH, SAFETY DURABILITY EASE OF OPERATION
The Duff Manufacturing Co.
Est. 1883
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BRANCH OFFICES: ATLANTA - CHICAGO - HOUSTON - NEW YORK - ST. LOUIS - SAN FRANCISCO

Adapted to all Types of rails and paving.

GODWIN
Steel Paving Guards
Proven by service to economically prevent seepage and disintegration of street railway paving.
Write for Illustrated Catalog No. 20
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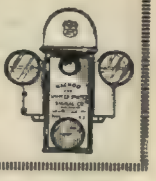

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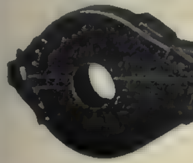

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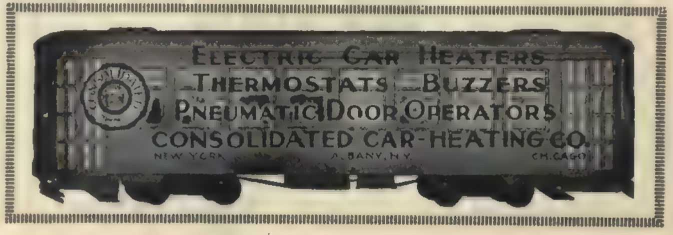

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BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

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EST LUDLUM 1854
Tool Steel
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THE SUPER ENDURING TOOL STEEL FOR BLANKING SILICON TRANSFORMER SHEETS AND ARMATURE DISCS
LUDLUM STEEL CO.
WATERVLIET-N.Y.-U.S.A.
WE HAVE A SPECIAL TOOL STEEL FOR EVERY SPECIFIC PURPOSE.
STAR

WM. WHARTON JR. & CO. INC.
TISCO MANGANESE STEEL TRACKWORK.

Wharton trackwork, in which the famous Tisco Manganese Steel has been used, will be found on the leading railways of the country.

Plant: Easton, Pa.

B. A. HEGEMAN, Jr., President H. A. HEGEMAN, First Vice-Pres. and Treas.
F. T. SARGENT, Secretary W. C. PETERS, Vice-Pres. Sales and Engineering

National Railway Appliance Co.
Grand Central Terminal, 452 Lexington Ave., Cor. 45th St., New York

BRANCH OFFICES
Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass
Hegeman-Castle Corporation, Railway Exchange Building, Chicago, Ill.

RAILWAY SUPPLIES

- Tool Steel Gears and Pinions
- Anglo-American Varnish Co., Varnishes, Enamels, etc.
- National Hand Holds
- Genesco Paint Oils
- Dunham Hopper Door Device
- Garland Ventilators
- Walter Tractor Snow Plows
- Ft. Pitt Spring & Mfg. Co., Springs
- Flaxlinum Insulation
- Anderson Slack Adjusters
- Economy Electric Devices Co., Power Saving and Inspection Meters
- Yellow Coach Mfg. Company—Single and Double-deck Buses
- Feasible Drop Brake Staffs

BUDA
ESTABLISHED
1881

Special Track Work of every description

THE BUDA COMPANY
Harvey (Suburb Chicago) Illinois

TULC
A
LUBRICANT

We make a specialty of
ELECTRIC RAILWAY
LUBRICATION
We solicit a test of TULC
on your equipment

The Universal Lubricating Co.
Cleveland, Ohio
Chicago Representatives: Jameson-Ross Company.
Straus Bldg.

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.

THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches	$4.50 an inch
4 to 7 inches	4.30 an inch
8 to 14 inches	4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

SAVE 30% TO 50% ON

RAILS-LOCOMOTIVES-CARS

Economy—Service
Quality—Reliability

HYMAN-MICHAELS COMPANY

Peoples Gas Bldg., Chicago

ST. LOUIS — DALLAS — LOS ANGELES
SAN FRANCISCO — PORTLAND — SEATTLE

FOR SALE

1—Snow Sweeper

Built by McGuire
Fine condition. Low price.
Immediate Delivery

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Phila., Pa.

10 Modern All Steel

DOUBLE TRUCK CARS

Weight, fully equipped, 37,000 lb.
Particulars and prices on application.

IRVING S. VAN LOAN CORPORATION
1750 Broadway, New York City

Specialists in street cars or any part of a street car.

Illustrated bulletin supplied on request.

Somewhere—

there's a buyer for the Equipment you no longer need. Reach him thru an advertisement in the SEARCHLIGHT SECTION.

POSITIONS VACANT

EXPERIENCED track foreman. Energetic man wanted on city work. Give references and experience in detail. P-958, Electric Railway Journal, Tenth Ave. at 36th St., New York.

POSITIONS WANTED

SUPERINTENDENT of rolling stock, 24 years' experience, open for position. PW-960, Electric Railway Journal, Tenth Ave. at 36th St., New York.

TRANSPORTATION official available. Broad experience, successful record, city and interurban properties, recognized ability, progressive, efficient, successful in handling labor. Public relations, traffic problem, selling transportation, increasing revenue. Fine references. PW-961, Electric Railway Journal, Guardian Bldg., Cleveland, Ohio.

WANTED position as master mechanic, 16 years' experience with two large interurban companies. Can furnish best of references from past and present employers. Very good reasons for making change. PW-959, Electric Railway Journal, Guardian Bldg., Cleveland, Ohio.

Searchlight Results:

Positions Vacant:

"The strongest proof that your Searchlight Department finds its way to many readers is shown by the numerous letters we have received in answer to our recent advertisement."

Secretary—A Connecticut Railway Co.

"You gave us one good man as a result of a similar advertisement in the Electrical Railway Journal some time ago. Please give us another."

Proprietor of Steel Sales Agency.

Positions Wanted:

"The result of advertising in the Searchlight Section of your Electric Railway Journal I have secured a position with The ——— Traction Co. of W. Va."

"I received 8 replies and accepted a position with the —— Railway Co. with over 30% increase in salary."

Business Opportunity:

Advertisement for investment to develop or acquire Traction Light & Pr. "The results from the advertisement in Electric Railway Journal have been satisfactory."

New York City Attorney.

Equipment For Sale:

"Our advertisement in the Electric Railway Journal located a buyer, and I have disposed of the car in question."

President—Buffalo Industrial Plant.

"We have disposed of all of our Girder Rails advertised in your paper. We are frank to tell you that the material went to three different traction lines and represents three separate and distinct new accounts. Our idea is that when it comes to bringing something to buyers in the traction field, there is but one sheet, and that is yours."

Dealer—New York City.

"There is no necessity for the continuation of this advertising, for the reason that we could have sold this equipment five times over from the advertisement that was run one time."

Superintendent—A Pennsylvania Railway Co.

Equipment Wanted:

"The two insertions of this advertisement which you displayed in admirable manner were sufficient to obtain for us the exact equipment that we desired."

Superintendent—A New England Railway Co.

For Every Business Want: *"Think Searchlight First"*

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Westinghouse Air Brake Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M Co.

Appraisals
American Appraisal Co.

Armature Shop Tools
Columbia Machine Works
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Cincinnati Car Co.
National Ry., Appliance Co.
Westinghouse E. & M. Co.

Axles (Front & Rear), Motor Truck & Passenger Car
Timken-Detroit Axle Co.

Axles, Steel
Carnegie Steel Co.
Ludlum Steel Co.

Axles, Trailer & Motor Bus
Timken-Detroit Axle Co.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Bearings and Bearing Metals
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Columbia Machine Works
Stucki Co., A.

Bells and Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Elec. Service Supplies Co.

Benders, Rail
Railway Trackwork Co.

Bodies, Bus
Brill Co., The J. G.

Body Material, Haskelite and Plymetl
Haskelite Mfg. Corp.

Boilers
Babcock & Wilcox Co.

Boiler, Tubes
National Tube Co.

Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.

Bonding Apparatus
American Steel & Wire Co.
Elec. Service Supplies Co
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co

Bonds, Rail
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
American Brake Shoe & Foundry Co.
Bemis Car Truck Co.
Brill Co., The J. G.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Westinghouse Tr. Br. Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
LeCarbone Co
Westinghouse E. & M. Co.

Brushholders
Columbia Machine Works

Bulkheads
Haskelite Mfg. Corp.

Bus Wheels, Steel
Heywood-Wakefield Co.

Buses
Brill Co., The J. G.

Buses, Motor
Studebaker Corp. of America
White Co., The

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia Machine Works

Cables (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co.

Cars, Gas-Electric
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

Cars, Gas, Rail
Brill Co., The J. G.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Brill Co., The J. G.
General Electric Co.

Castings, Gray Iron and Steel
American Steel Foundries
Bemis Car Track Co.

Castings, Malleable & Brass
Bemis Car Truck Co.

Catchers and Retrievers, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceiling Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Ceilings, Plywood, Panels
Haskelite Mfg. Corp.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.

Circuit-Breakers
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.

Clusters and Sockets
General Electric Co.

Coil Banding and Winding Machines
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Coils, Armature and Field
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Counting Machines
Cleveland Fare Box Co.
International Register Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Columbia Machine Works
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Electrical Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Compressors, Air
General Electric Co.
Westinghouse Tr. Br. Co.

Condensers
General Electric Co.
Westinghouse E. & M. Co.

Condensor Papers
Irvington Varnish & Ins. Co.

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Columbia Machine Works
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers or Parts
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.

Copper Wire
American Brass Co.
Amer. Steel & Wire Co.
Anaconda Copper Mining Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register
Amer. Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
Samson Cordage Works

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cranes, Hoists & Lifts
Electric Service Supplies Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Frogs & Switches
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Track (See Track Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Pantasote Co., Inc.

Dealer's Machinery & Second Hand Equipment
Electric Equipment Co.
Hyman-Michaels Co.
Van Loan Corp., Irving S.

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Elec. Service Supplies Co.

Detective Service
Wish-Service, P. Edward

Door Operating Devices
Brill Co., The J. G.
Consolidated Car Heating Co.
National Pneumatic Co.

Doors & Door Fixtures
Brill Co., The J. G.
General Electric Co.
Hale-Kilburn Co.

Doors, Folding Vestibule
National Pneumatic Co.

Drills, Track
Amer. Steel & Wire Co.
Electric Service Supplies Co.
Ohio Brass Co.

Dryers, Sand
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Ears
Columbia Machine Works
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Electric Grinders
Railway Trackwork Co.

Electric Refrigerator Cars
Phoenix Ice Machine Co.

Electrical Wires and Cables
Amer. Electrical Works.
Amer. Steel & Wire Co.
John A. Roebling's Sons Co.

Electrodes, Carbon
Railway Trackwork Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.

Engineers, Consulting, Contracting and Operating
Archbold-Brady Co.
Beeler, John A.
Buchanan & Layng Corp.
Byllesby Co., H. M.
Day & Zimmermann, Inc.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster
White Eng. Corp., The J. G.

Engines, Gas, Oil or Steam
Westinghouse E. & M. Co.

Exterior Side Panels
Haskelite Mfg. Corp.

Fare Boxes
Cleveland Fare Box Co.
Nat'l Ry. Appliance Co.
Perey Mfg. Co.

Fare Registers
Electric Service Supplies Co.
Ohmer Fare Register Co.

Fences, Woven Wire and Fence Posts
Amer. Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Cincinnati Car Co
Consolidated Car Fender Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Coils (See Coils)

Flangeway Guards, Steel
Godwin Co., Inc., W. S.

Flaxlinum Insulators
National Railway Appliance Co.

Floodlights
Electric Service Supplies Co.

Floor, Sub
Haskelite Mfg. Corp.

Floors
Haskelite Mfg. Corp.

Forgings
Brill Co., The J. G.
Duff Mfg. Co.

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Frogs, Track (See Track Work)

Frogs, Trolley
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Fuses and Fuse Boxes
Consolidated Car Heating Co.
General Electric Co.
Westinghouse E. & M. Co.

Fuses, Refillable
General Electric Co.

Gaskets
Westinghouse Tr. Br. Co.

Gas Producers
Westinghouse E. & M. Co.

Gates, Car
Brill Co., The J. G.
Cincinnati Car Co.

Gauges, Oil and Water
Ohio Brass Co.

Gear Blanks
Brill Co., The J. G.

Gear Cases
Chillingworth Mfg. Co.
Electric Service Supplies Co
Westinghouse E. & M. Co.

Gears and Pinions
Bemis Car Truck Co.
Electric Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.
R. D. Nuttall Co.

Generating Sets, Gas-Electric
General Electric Co.

Generators
General Electric Co.
Westinghouse E. & M. Co.

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gongs (See Bells and Gongs)

Greases (See Lubricants)

Grinders & Grinding Supplies
Railway Trackwork Co.

Grinders, Portable
Railway Trackwork Co.

Grinders, Portable Electric
Railway Trackwork Co.

Grinding Bricks and Wheels
Railway Trackwork Co.

Guard Rail Clamps
Ramapo Ajax Corp.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Guards, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Columbia Machine Works
Elec. Service Supplies Co.
R. D. Nuttall Co.
Star Brass Works

Headlights
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

Headlining
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heat. & Ltg. Co.
Nat'l Ry. Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car Stove
Smith Heater Co., Peter

Helmets, Welding
Railway Trackwork Co.
Una Welding & Bonding Co.

Hose, Bridges
Ohio Brass Co.

(Continued on page 34)

"The Standard for Rubber Insulation"

INSULATED WIRES and CABLES

"Okonite," "Manson," and Dundee "A" "B" Tapes

Send for Handbook

The Okonite Company

The Okonite-Callender Cable Company, Inc.

Factories, PASSAIC, N. J. PATERSON, N. J.

Sales Offices: New York Chicago Pittsburgh St. Louis Atlanta Birmingham San Francisco Los Angeles Seattle

Pettingell-Andrews Co., Boston, Mass.
F. D. Lawrence Electric Co., Cincinnati, O.
Novelty Electric Co., Phila., Pa.
Can. Rep.: Engineering Materials Limited, Montreal.
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There is a Peirce Specialty for every Distribution requirement

HUBBARD

Hubbard and COMPANY

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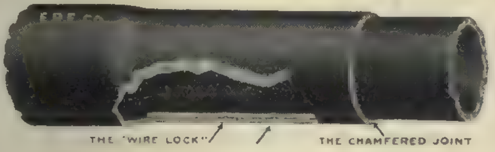
ELRECO TUBULAR POLES



COMBINE

Lowest Cost Lightest Weight
Least Maintenance Greatest Adaptability

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO
New York City, 30 Church Street

Arc Weld Rail Bonds

AND ALL OTHER TYPES

Descriptive Catalogue Furnished

American Steel & Wire Company

New York Chicago Boston Cleveland Pittsburgh Denver
U. S. Steel Products Co.
San Francisco Los Angeles Portland Seattle

Surplus Stocks Are Easily Disposed of *Through the*

"SEARCHLIGHT SECTION"

"FOR SALE" announcements are carefully read by the trade.

"SEARCHLIGHT" Ads bring prompt and profitable returns.

Displayed—$6.65 an inch or less per insertion.

0143

The DIFFERENTIAL CAR

Standard on 60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential Bottom Dump Ballast Car
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

Boyerized Parts:

Brake Pins
Brake Hangers
Brake Levers
Pedestal Gibs
Brake Fulcrums
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Side Bearings
Spring Post Bushings
Spring Posts
Bolster and Transom Chafing Plates
Manganese Brake Heads
Manganese Truck Parts
Bushings
Bronze Bearings
McArthur Turnbuckles

Can be purchased through the following representatives:

Economy Electric Devices Co.,
Old Colony Bldg., Chicago, Ill.
F. F. Bodler,
903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney,
54 First Street, Portland, Oregon.
J. H. Denton,
1328 Broadway, New York City, N. Y.
A. W. Arlin,
772 Pacific Electric Bldg., Los Angeles, Cal.

Bemis Car Truck Company
Springfield, Mass.

AMERICAN ELECTRICAL WORKS AMELECTRIC Wires and Cables PHILLIPSDALE, R.I.

Reg. U. S. Pat Office

AMELECTRIC PRODUCTS

BARE COPPER WIRE AND CABLE
TROLLEY WIRE
WEATHERPROOF WIRE AND CABLE
PAPER INSULATED UNDERGROUND CABLE
MAGNET WIRE

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

Boston, 176 Federal: Chicago, 20-32 West Randolph Street: Cincinnati, Traction Bldg.: New York, 100 E. 42nd St.

Hose, Pneumatic
Westinghouse Traction Brake Co.

Instruments, Measuring, Testing and Recording
Amer. Steel & Wire Co.
General Electric Co.
Westinghouse E. & M. Co.

Insulating Cloth, Paper and Tape
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
Westinghouse E. & M. Co.

Insulating Silk
Irvington Varnish & Ins. Co.

Insulating Varnishes
Irvington Varnish & Ins. Co.

Insulation (See also Paints)
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
Westinghouse E. & M. Co.

Insulation Slots
Irvington Varnish & Ins. Co.

Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.

Insulators (See also Line Materials)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Interior Side Linings
Haskelite Mfg. Corp.

Interurban Cars (See Cars)

Jacks (See also Cranes, Hoists and Lifts)
Buda Co.
Duff Mfg. Co.
Elec. Service Supplies Co.
National Ry. Appliance Co.

Joints, Rail (See Rail Joints)

Journal Boxes
Bemis Car Truck Co.
Brill Co., The J. G.

Lamp Guards and Fixtures
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Arc & Incandescent (See also Headlights)
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Signal and Marker
Elec. Service Supplies Co.
Ohio Brass Co.

Letter Boards
Haskelite Mfg. Corp.

Lightning Protection
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
Archbold-Brady Co.
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Locking Spring Boxes
Wm. Wharton, Jr. & Co.

Locomotives, Electric
General Electric Co.
Westinghouse E. & M. Co.

Lubricating Engineers
Universal Lubricating Co.

Lubricants, Oil and Grease
Universal Lubricating Co.

Manganese Parts
Bemis Car Truck Co.

Manganese Steel Guard Rails
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co.

Manganese Steel, Special Track Work
Bethlehem Steel Co.
Wm. Wharton, Jr. & Co.

Manganese Steel Switches, Frogs and Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Meters (See Instruments)

Motor and Generator Sets
General Electric Co.

Motor Buses (See Buses, Motor)

Motors, Electric
General Electric Co.
Westinghouse E. & M. Co.

Motorman's Seats
Brill Co., The J. G.
Elec. Service Supplies Co.
Wood Co., Chas. N.

Nuts and Bolts
Bemis Car Truck Co.
Hubbard & Co.

Oils (See Lubricants)

Omnibuses (See Buses, Motor)

Packing
Westinghouse Traction Brake Co.

Paints and Varnishes (Insulating)
Elec. Service Supplies Co.
Irvington Varnish & Ins. Co.

Paints and Varnishes for Woodwork
National Ry. Appliance Co.

Panels, Outside, Inside
Haskelite Mfg. Corp.

Paving Guards, Steel
Godwin Co., Inc., W. S.

Pickup, Trolley Wire
Elec. Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Elec. Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

Pinions (See Gears)

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Punches, Ticket
International Register Co.
Wood Co., Chas. N.

Rail Braces and Fastenings
Ramapo Ajax Corp.

Rail, Filler
Philip Carey Co., The

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.
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Brill Co., The J. G.
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Brill Co., The J. G.
Elec. Service Supplies Co.
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Sash Fixtures, Car
Brill Co., The J. G.

Sash, Metal Car Window
Hale-Kilburn Co.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
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Seating Materials
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Haskelite Mfg. Corp.
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Seats, Bus
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Brill Co., The J. G.
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Side Bearings (See Bearings Center and Side)

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Elec. Service Supplies Co.
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Trolley Wheels (See Wheels Trolley)

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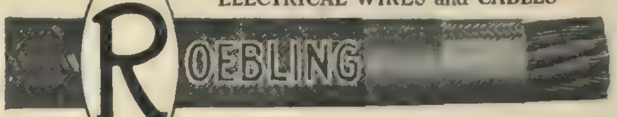

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ALPHABETICAL INDEX TO ADVERTISEMENTS

Page

A

American Appraisal Co., The ... 22
American Brass Co., The ... 35
American Car Co ... 37
American Electrical Works ... 33
American Steel & Wire Co ... 33
American Steel Foundries ... 8
Anaconda Copper Mining Co ... 35
Archbold-Brady Co ... 28

B

Babcock & Wilcox Co ... 29
Beeler Organization ... 28
Bemis Car Truck Co ... 33
Bethlehem Steel Co ... 30
Brill Co., The J. G ... 37
Buchanan & Layng Corp ... 28
Buda Co., The ... 30
Byllesby Eng. & Management Corp. ... 28

C

Cameron Electrical Mfg. Co ... 35
Carey Co., The Philip ... 14-15
Carnegie Steel Co ... 26
Chillingworth Mfg. Co ... 29
Cincinnati Car Co ... 13
Cleveland Fare Box Co ... 29
Collier, Inc., Barron G ... 24
Consolidated Car Fender Co ... 35
Consolidated Car Heating Co ... 29

D

Day & Zimmermann, Inc ... 28
Differential Steel Car Co., The ... 33
Duff Manufacturing Co., The ... 29

Page

E

Easton Car & Construction Co ... 27
Electric Equipment Co ... 31
Electric Ry. Equipment Co ... 33
Electric Service Supplies Co ... 9

F

Firestone Tire & Rubber Co ... 20
Ford, Bacon & Davis ... 28
"For Sale" Ads ... 31

G

General Electric Co. .18, Back Cover
Godwin Co., Inc., W. S ... 29
Gold Car Heating & Ltg. Co ... 35
Goodyear Tire & Rubber Co., The ... 12

H

Hale-Kilburn Co ... 36
Haskelite Mfg. Corp ... 36
"Help Wanted" Ads ... 31
Hemphill & Wells ... 28
Holst, Englehardt W ... 28
Hubbard & Co ... 33
Hyman-Michaels Co ... 31

I

International Register Co ... 29
International Steel Tie Co., The. 7
Irvington Varnish & Insulator Co. ... 29

J

Jackson, Walter ... 28
Jeandron, W. J ... 26

Page

K

Kelker, DeLeuw & Co ... 28
Kelly-Springfield Tire Co ... 23
Kuhlman Car Co ... 37

L

LeCarbone Co ... 26
Ludlum Steel Co ... 30
Lorain Steel Co ... 30

M

McClellan & Junkersfeld ... 28

N

Nachod and U. S. Signal Co ... 29
National Brake Co ... 19
National Pneumatic Co ... 11
National Ry. Appliance Co ... 30
National Tube Co ... 25
Naugle Pole & Tie Co ... 35
Nuttall Co., R. D ... 10

O

Ohio Brass Co ... 5
Okonite-Callender Cable Company, Inc., The ... 33
Okonite Co., The ... 33

P

Pantasote Co., Inc ... 26
Perey Mfg. Co., Inc ... 35
Phoenix Ice Machine Co ... 26
Positions Wanted and Vacant ... 31

Page

R

Railway Track-work Co ... 35
Railway Utility Co ... 35
Ramapo Ajax Corp ... 35
Richey, Albert ... 28
Roebling's Sons Co., John A ... 35

S

Samson Cordage Works ... 35
Sanderson & Porter ... 28
Searchlight Section ... 31
Smith Heater Co., Peter ... 35
Star Brass Works ... 30
Stevens & Wood, Inc ... 28
Stone & Webster ... 28
Stucki Co., A ... 35
Studebaker Corp. of America, The. 21

T

Timken-Detroit Axle Co., The. . 16

U

Una Welding & Bonding Co ... 29
United States Rubber Co ... 17
Universal Lubricating Co ... 30

V

Van Loan Corp., Irving S ... 31

W

"Want" Ads ... 31
Wason Mfg. Co ... 37
Westinghouse Elec. & Mfg. Co. .2, 4
Westinghouse Traction Brake Co. 6
Wharton, Jr. & Co., Inc., Wm. .. 30
"What and Where to Buy". .32-34
White Co., The .... Front Cover
White Eng. Corp., The J. G ... 28
Wish Service, The P. Edw ... 29
Wood Co., Chas. N ... 35

Our advertisement in the issue of January 1 showed how

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Another ad will appear next week.

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Total	44.19c.	26.00c.

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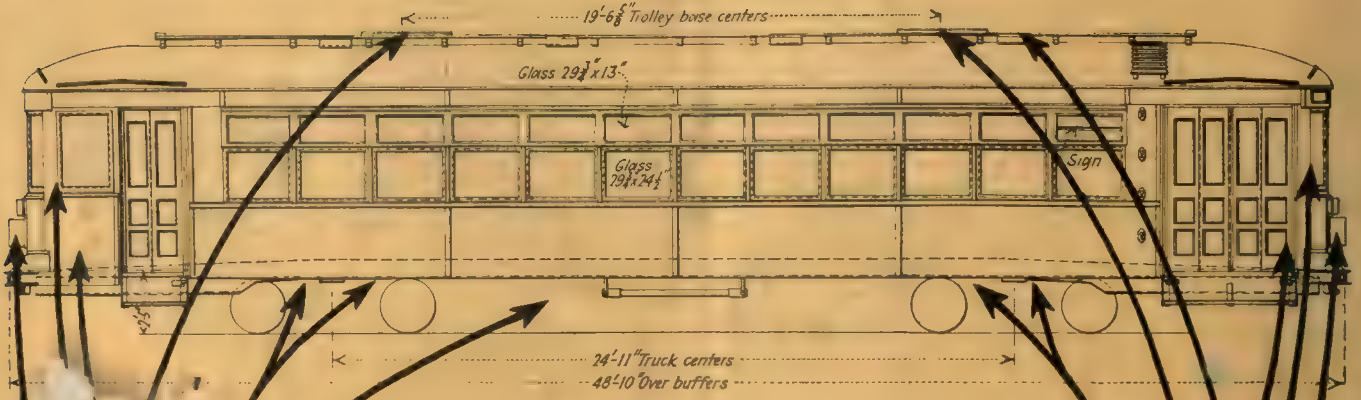

which will be equipped with

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G-E K-35 KK Control
G-E Headlights
G-E US 20A Trolley Base
G-E Lightning Arresters

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330-38

GENERAL ELECTRIC

MAINTENANCE AND CONSTRUCTION ISSUE

-Hill Publishing Company, Inc. January 15, 1927 Twenty Cents per Co

ELECTRIC RAILWAY JOURNAL

8 miles in 8 weeks!

And twenty-three more to go!

The illustration below shows part of eight miles of Steel Twin Tie track built by the Kansas City Public Service Company during the latter part of 1926.

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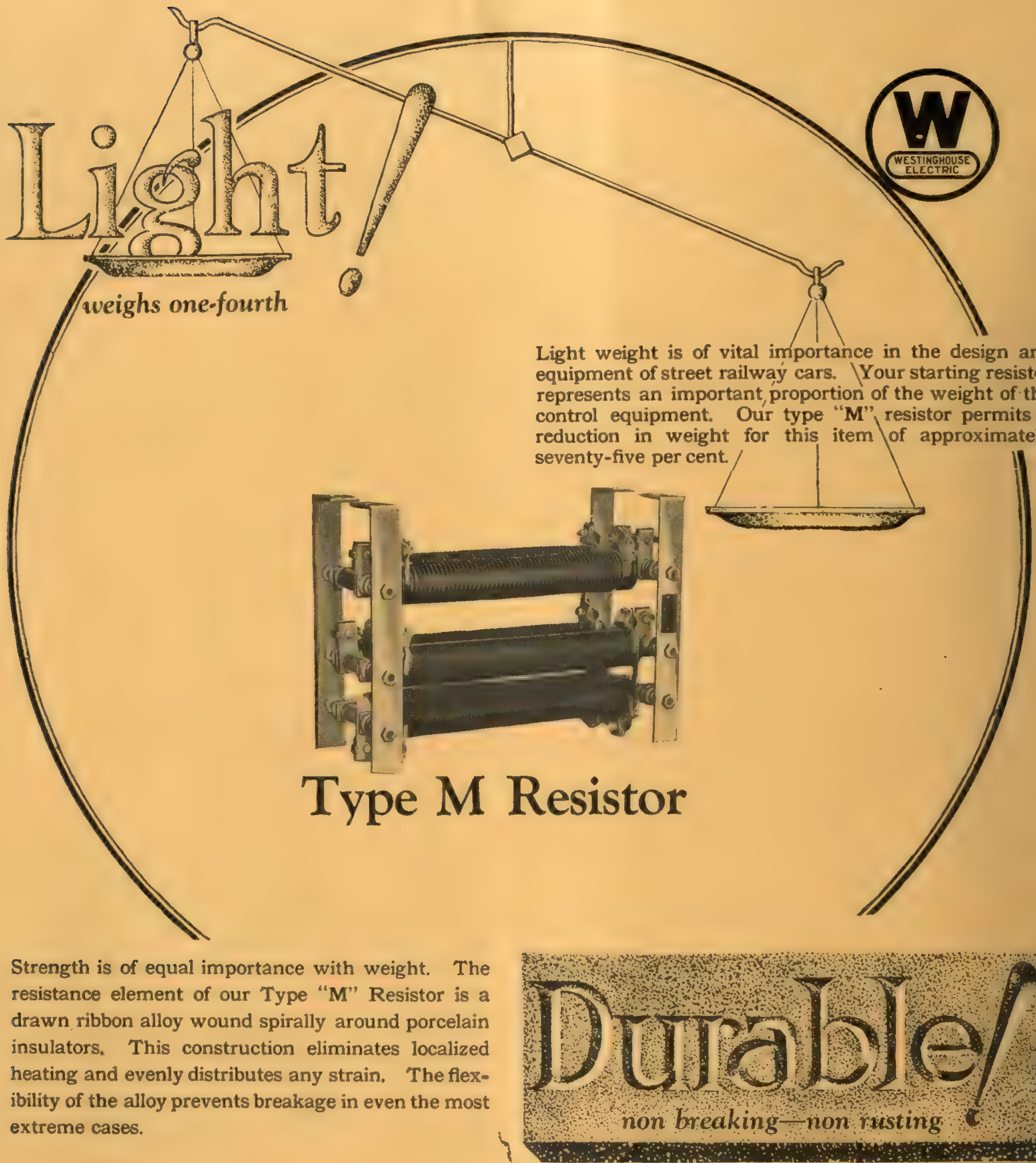

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Vol. 69
No. 3

Pages
105-148

CONTENTS

JANUARY 15, 1927

Editorials 105

Modern Repair Methods in New B.-M. T. Shop.....108

Latest types of tools to insure rapid and efficient repairs to electric car equipment are installed in the shop devoted to electrical repairs for the Brooklyn-Manhattan Transit Corporation.

Kansas City Reconstruction Program Well Under Way 113

Eight miles of track was reconstructed or built new following the lifting of the receivership on Oct. 15 before cold weather set in.

Government Active in Standardization Movement..114

Better-Appearing Cars Needed 115

The electric railway industry has accepted the challenge for more attractive rolling stock. New equipment should be provided where possible and at the same time increased attention must be given to sprucing up existing cars.

Study Car Equipment with Reference to Appearance, Comfort and Convenience..........115

BY W. R. MCRAE.

Rolling Stock Should Give Best Impression Possible 116

BY A. T. CLARK.

Sun Visor Protects Motorman from Glare........116

Methods and Equipment for Efficient Assembling of Commutators...................117

BY JESSE M. ZIMMERMAN.

Many important considerations must be taken into account in assembling the individual parts of V-bound commutators and in pressing the complete commutators on the spider. Methods of tightening and aligning commutators are described.

We Are Acquiring a New Viewpoint.............123

BY WILLITS H. SAWYER.

Manufacturer and operator have a common interest in the future of the transportation business. Former methods and precedents are subject to question. There is growing evidence that improvement of facilities is a paying process.

Curbstone Parking Can Serve Only a Few at Best 124

Development of Commercial Sense Needed........125

BY R. N. GRAHAM.

Modernization of town and city transportation demands more than new physical equipment. A large amount of business can be developed, but it requires the right attitude. Formation of commercial department urged.

The Readers' Forum 128

Adventures of Old Man Trouble...................129

Maintenance Notes 130

Association News and Discussion...................135

News of the Industry..............................138

Recent Bus Developments 143

Financial and Corporate 144

Personal Mention 146

Manufactures and the Markets.....................148

Making Neighbors

ELECTRIC railway men in the more populous districts are fortunate in their opportunity of frequent contact with others in similar lines of work. They can look over one another's systems, and find such contact stimulating and instructive. But many railways are so located that frequent visits to other properties are impracticable. Distances are too great.

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Thus do the railway officials in distant towns keep in touch with the progress of the industry. For those more centrally located it is of equal value as a guide to what is most worthy of attention when on a trip to other cities, and from week to week as a source of prompt and accurate information.

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SAVING THE RAIL SAVES THE RAILWAY

Actions, not words, sell rides

You can sell rides only by doing something to make them attractive. Words sell nothing until they proclaim something achieved.

Advertise your service by all means, but first do something worth talking about.

For example—rejuvenate your track. Grind out the corrugations, weld and grind the joints. Only then can you talk about good service. Whether your cars be old or new, you can give combined speed, safety, silence and comfort only on well-maintained track.

The cost of keeping track ever fit is cut to the limit by the modern equipment shown here.

Quotations now?

Railway Trackwork Co.

3132-48 East Thompson Street, Philadelphia

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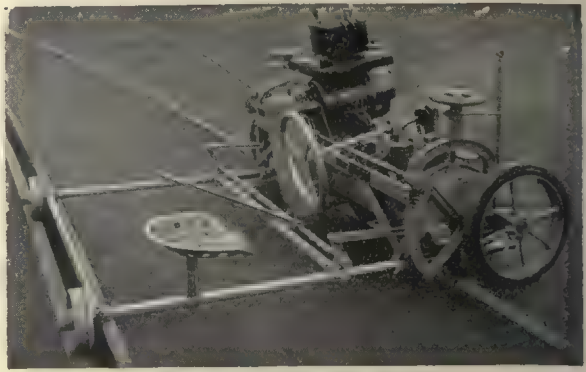
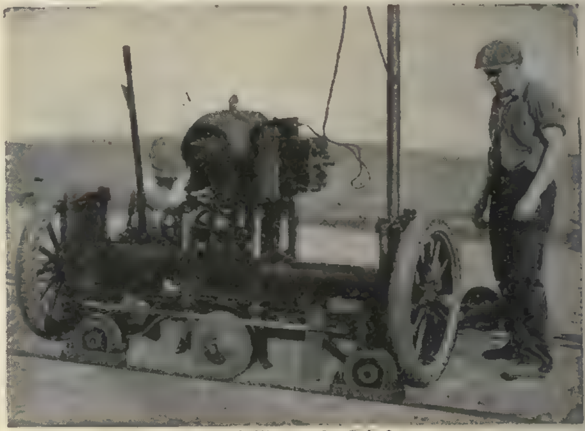
Frazer & Co., Japan.

1438

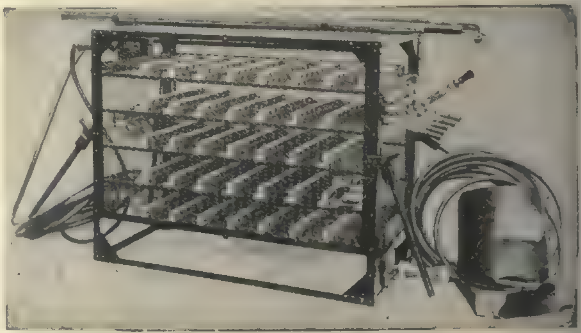


"Improved Atlas" Rail Grinder



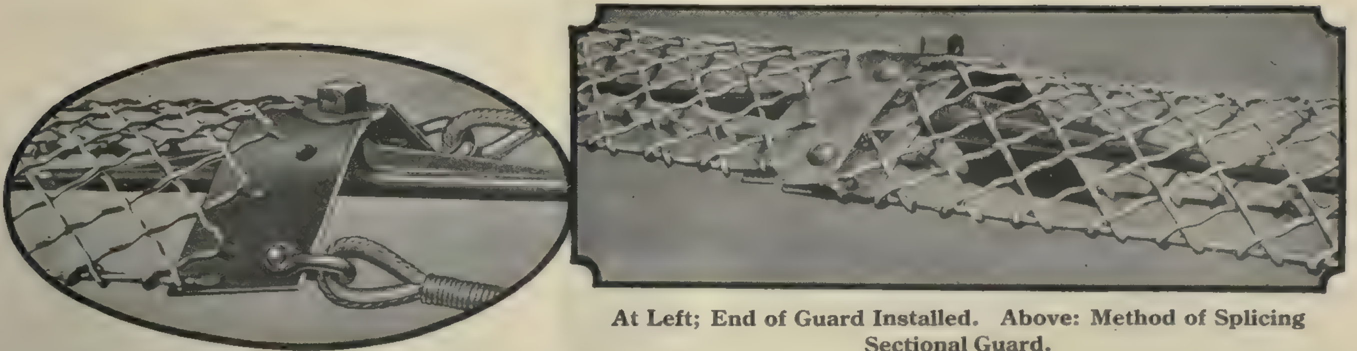
"Imperial" Track Grinder

Reciprocating Track Grinder



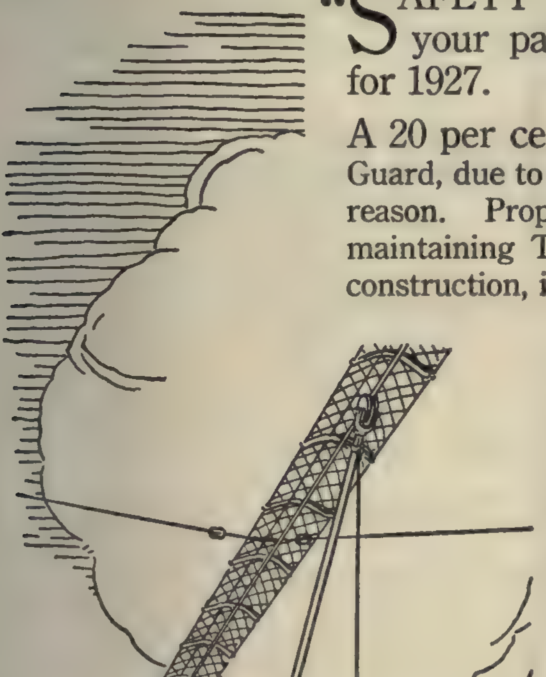
"Ajax" Electric Arc Welder

SAVING THE RAIL SAVES THE RAILWAY



At Left; End of Guard Installed. Above: Method of Splicing Sectional Guard.

Have "Safety Crossings" Now—At A Lower Cost



"SAFETY CROSSINGS" may well be included in your patronage-winning revenue-increasing plans for 1927.

A 20 per cent reduction in the price of O-B Trolley Guard, due to manufacturing and selling economies, is one good reason. Proportionate savings in the cost of installing and maintaining Trolley Guard, due to its improved sectionalized construction, is another important consideration.

Makes Safe Cars Safer

There are still better reasons: "Safety Crossings" make safe cars safer by preventing the stalling of cars at the most dangerous points on your system; they prevent traffic delays at such points; and they build good will by advertising the fact that car riders are protected with every needed safety device.

Trolley guard has been used for years by scores of the most progressive properties. It has proved the only effective means of preventing loss of power due to dewirements at dangerous railroad crossings.

May we send you complete and detailed information, now? Address

Ohio Brass Company, Mansfield, Ohio
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada
286B

Ohio Brass Co.

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES

Brake'em-hard!

QUICK starts—and even quicker stops!

Acceleration—2 m.p.h. per second!
Braking as high as 3 m.p.h. per second!

This is necessary to keep ahead of the other street traffic—the modern idea in trolley car operation. Such operation soon brings ordinary steel wheels to the shop.

Flats and shell-outs are more frequent.

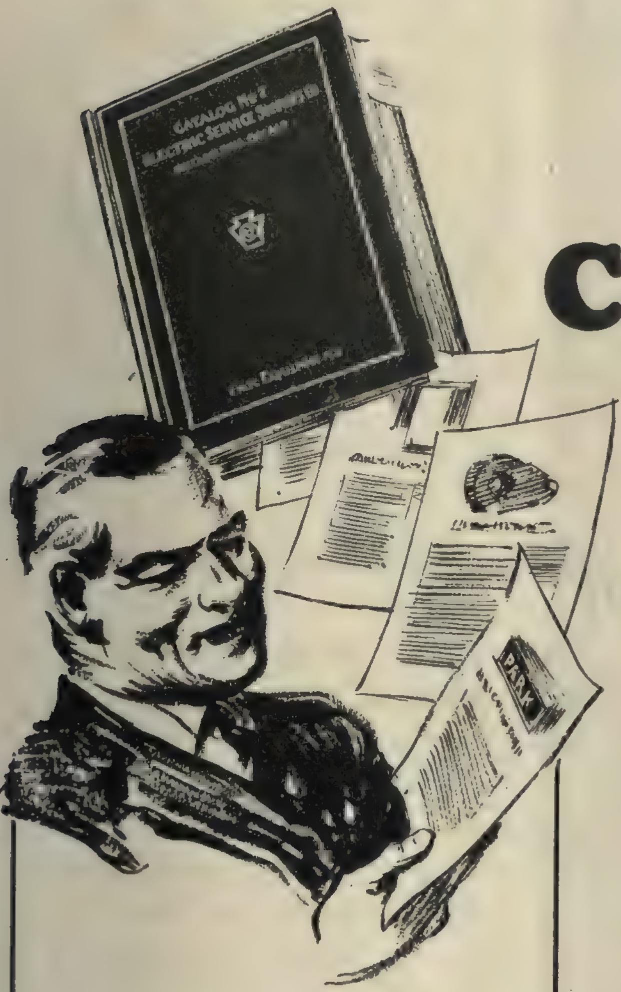
Roads using Davis "One-Wear" Steel Wheels avoid this maintenance expense. Thoughout their longer life, Davis Wheels needs no contour reconditioning. Their greater strength resists the greater stresses of modern operation.

AMERICAN STEEL FOUNDRIES

NEW YORK CHICAGO ST. LOUIS

Have you this complete buying guide of car equipment?

ESSCO Catalog No. 7



Here you will find listed, illustrated and described, thousands of devices, parts and supplies. The tiniest screw in a Faraday Buzzer can be identified and ordered by its Catalog number. The lens or reflector for a Golden Glow Headlight is likewise cataloged. Whether it's a gear case or a match box holder you're looking for—ESSCO Catalog No. 7 should be your first reference.

Write today for your copy!

Some items selected from
ESSCO Catalog No. 7

- Golden Glow Headlights
- Faraday Signal Systems
- Hunter-Keystone Signs
- Steel Gear Cases
- Motorman's Seats
- Lighting Fixtures
- Headlight Resistances
- Air Sanders
- Trolley Catchers
- Shelby Trolley Poles
- Rotary Gongs
- International Fare Registers
- Fare Register Fittings
- Samson Cordage
- Air Valves
- Cord Connectors
- Trailer Connectors
- Automatic Door Signals
- Standard Trolley Harps
- Standard Trolley Wheels
- Peerless Coil Winding Tools
- Peerless Armature Machines
- Insulating Materials
- Cass Commutator Stones
- Sand Driers
- Peerless Pinion Pullers
- Employees' Badges
- Line Material
- Portable Lamp Guards

ELECTRIC SERVICE SUPPLIES CO.

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO
Illinois Merchants' Bank Bldg.

PITTSBURGH
1123 Bessemer Bldg.

BOSTON
88 Broad St.

SCRANTON
316 N. Washington Ave.

DETROIT
General Motors Building

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver

KEYSTONE CAR EQUIPMENT

Interlocking brakes and doors by means of the M-28 Brake Valve with selective control, increases safety and convenience.

How to make cars
SAFE *and*
make them
SAVE

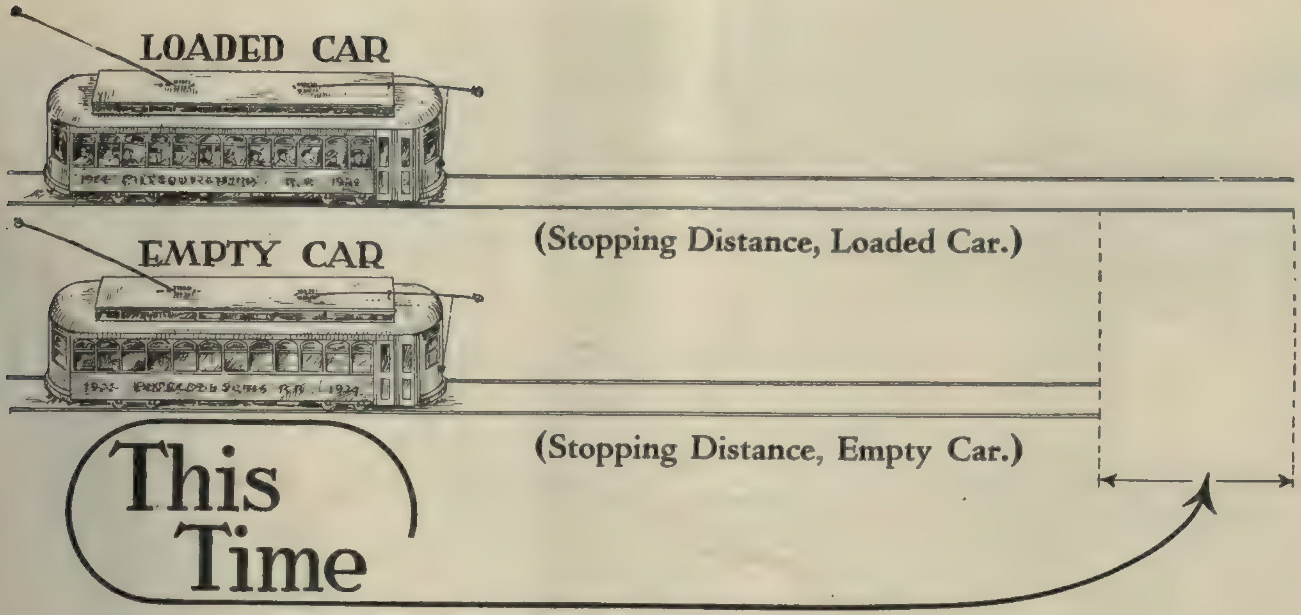
MORE than 14,000 cars are now active demonstrations that operating safety is increased and operating expense is decreased when operating responsibility is centralized in one man whose duties are safeguarded and simplified by complete protective and labor-saving devices which interlock car-control, door-opening, and brake-manipulation functions.

Make *your* new cars safe, and make them save with the Safety Car Control Equipment.

We make the Safety Car Control Devices which make the Safety Car.

SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.
Postal and Telegraphic Address:
WILMERDING, PA.
CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

Interlocking the power and brakes by means of special controller handle provides safeguard against operator's inattention or disability.


LOADED CAR
EMPTY CAR
(Stopping Distance, Loaded Car.)
(Stopping Distance, Empty Car.)
This Time

Can be Saved

WITH the ordinary form of air brake equipment the maximum retarding force is limited to that which is ample and permissible for an empty car, but which is inadequate to effect the proper degree of control on a loaded car—particularly if it has a high ratio of loaded to empty weight—with the result that the stop is lengthened and more time is consumed.

But this time can be saved!

The Westinghouse Variable Load Brake, adapted specifically for modern light weight surface cars, eliminates the difference in retarding effect on empty and loaded cars—by an automatic adjustment of brake cylinder pressure with the changing load—and insures that stops will be as short under all conditions as would normally be possible only with an empty car.

The saving in time, effected by the uniformly shorter stops, is translated into faster schedule speeds just when time is most valuable—during those periods when there is a demand for quick transportation of large volumes of revenue-producing traffic.

Mass transportation can be accelerated to increase the profit and popularity of your service by the use of this modern brake on your modern cars.

Information regarding Westinghouse Variable Load Brakes may be obtained upon application to our nearest district office — *Ask for Descriptive Catalogue T-2045.*

WESTINGHOUSE TRACTION BRAKE CO.
General Office and Works, WILMERDING, PA.

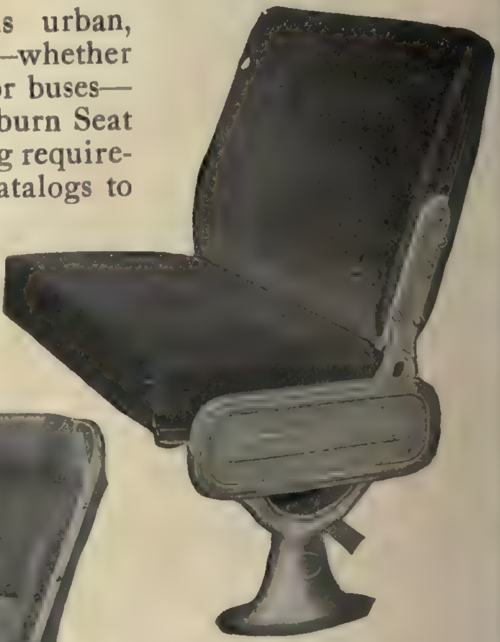
WESTINGHOUSE TRACTION BRAKES

Seats for every service

Whether the service is urban, suburban or interurban—whether it is electric cars or motor buses—you will find a Hale-Kilburn Seat to meet your most exacting requirements. Write for our catalogs to get complete particulars.

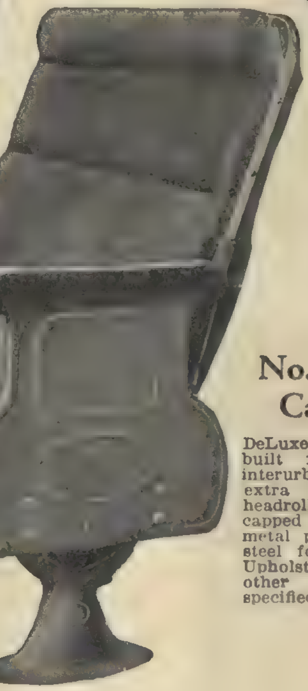
No. 901
Bus Seat

DeLuxe type seat—designed especially for buses — has divided back, spring cushion and air cushion pads. Upholstered in leather, imitation leather or plush as specified.



No. 199-F
Car Seat

Inexpensive, comfortable seat, made for suburban and light-weight interurban cars, has plush upholstered spring edge cushion and detachable back.



No. 392-EE
Car Seat

DeLuxe type seat — built for the finest interurban cars — has extra high three-part headroll, mahogany capped armrest and metal parts of pressed steel for light weight. Upholstered in plush or other materials as specified.

HALE-KILBURN COMPANY

General Offices and Works: 1800 Lehigh Avenue, Philadelphia

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T. C. Coleman & Son, Starks Bldg., Louisville

W. L. Jefferies, Jr., Mutual Bldg., Richmond
W. D. Jenkins, Praetorian Bldg., Dallas, Texas
H. M. Euler, 146 N. Front St., Portland, Oregon

Hale and Kilburn SEATS

ROME WIRE CO.
ROME, N.Y.

Building a copper highway for power

EACH year sees thousands of new miles added to America's vast network of electrical generating systems. Each year sees an increasing amount of Rome Bare Transmission Cables being strung to build these systems.

If you follow span after span of copper cables on into the distribution circuits, to home and factory, you will find other Rome wires—Rome Weatherproof Wire—Rome Cutting-in and Lead Encased Cables—RomeX, the original non-metallic sheathed cable, and Rome Code Wire.

All these are but a part of the broad line of wires and cables that are manufactured in Rome Mills to fill the countless wiring needs of industry.

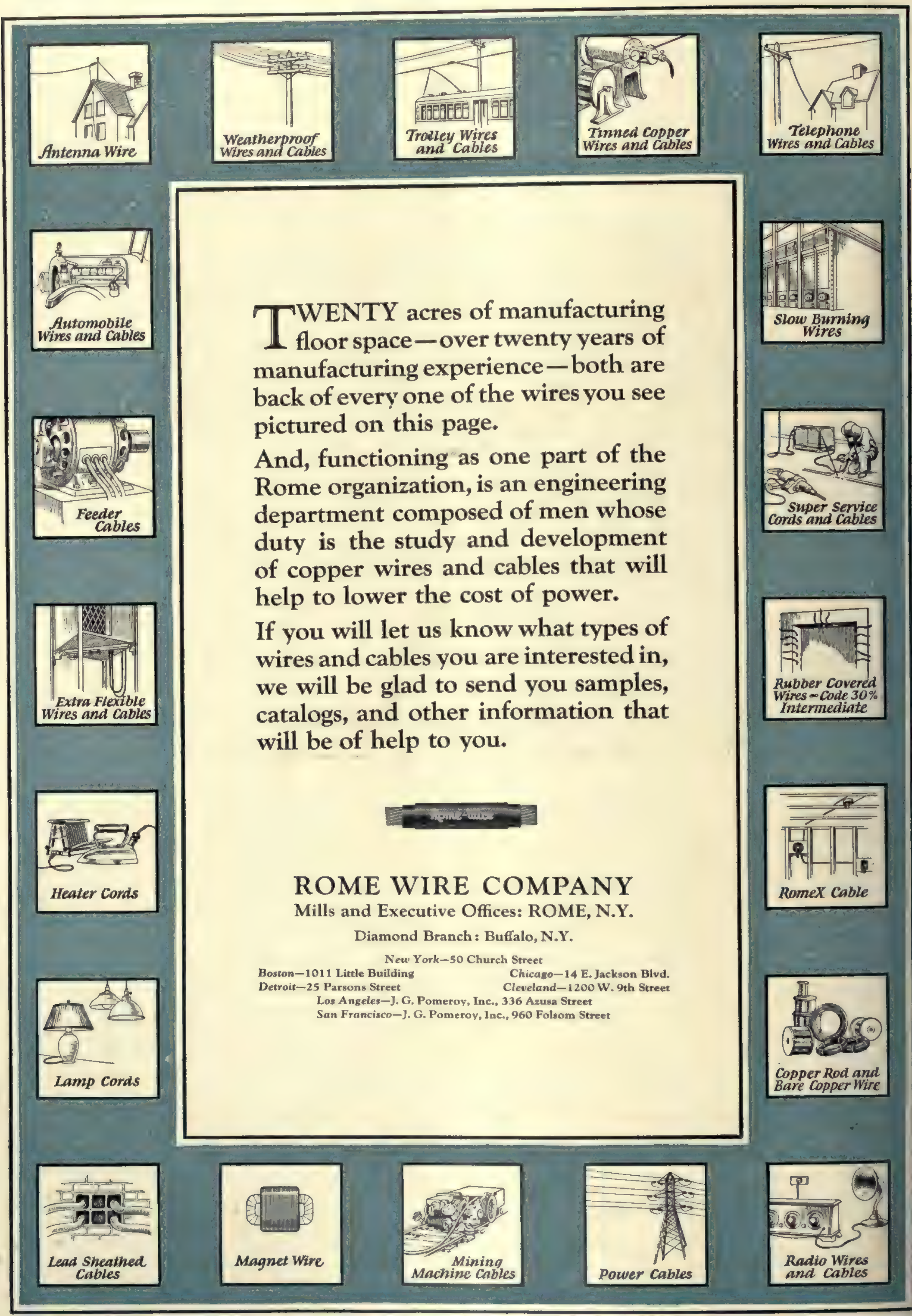
Rome Service, ample stocks, and competitive prices, are at your disposal—while an opportunity to quote on any of your wire requirements will always be welcome.

Stranded Copper Wire

ROME WIRE COMPANY, ROME, N.Y.

ROME WIRE

FROM WIRE BAR TO FINISHED COPPER WIRE


Antenna Wire
Weatherproof Wires and Cables
Trolley Wires and Cables
Tinned Copper Wires and Cables
Telephone Wires and Cables
Automobile Wires and Cables
Slow Burning Wires
Feeder Cables
Super Service Cords and Cables
Extra Flexible Wires and Cables
Rubber Covered Wires – Code 30% Intermediate
Heater Cords
RomeX Cable
Lamp Cords
Copper Rod and Bare Copper Wire
Lead Sheathed Cables
Magnet Wire
Mining Machine Cables
Power Cables
Radio Wires and Cables
ROME-WIRE

TWENTY acres of manufacturing floor space—over twenty years of manufacturing experience—both are back of every one of the wires you see pictured on this page.

And, functioning as one part of the Rome organization, is an engineering department composed of men whose duty is the study and development of copper wires and cables that will help to lower the cost of power.

If you will let us know what types of wires and cables you are interested in, we will be glad to send you samples, catalogs, and other information that will be of help to you.

ROME WIRE COMPANY
Mills and Executive Offices: ROME, N.Y.

Diamond Branch: Buffalo, N.Y.

New York—50 Church Street
Boston—1011 Little Building
Chicago—14 E. Jackson Blvd.
Detroit—25 Parsons Street
Cleveland—1200 W. 9th Street
Los Angeles—J. G. Pomeroy, Inc., 336 Azusa Street
San Francisco—J. G. Pomeroy, Inc., 960 Folsom Street

THROUGH THE FLOOD

When the Florida hurricane flooded 78 cars of the Florida Power & Light Company to a level higher than the seat backs, there were 50 of these cars equipped with National Pneumatic floor-type sliding door engines. These floor engines were completely submerged in the turbulent flood waters for days.

All other flooded items of equipment had to be taken down, washed out, baked and placed back in the cars. The National Pneumatic Door Engines, however, were simply drained and were ready to operate without missing a stroke as soon as the air pumps started.

To withstand conditions such as these, the National Pneumatic Door Engine has to be and *is* "a nice piece of mechanism."

NP

National Pneumatic Company

Executive Office, 50 Church Street, New York

General Works, Rahway, New Jersey

CHICAGO
518 McCormick Building

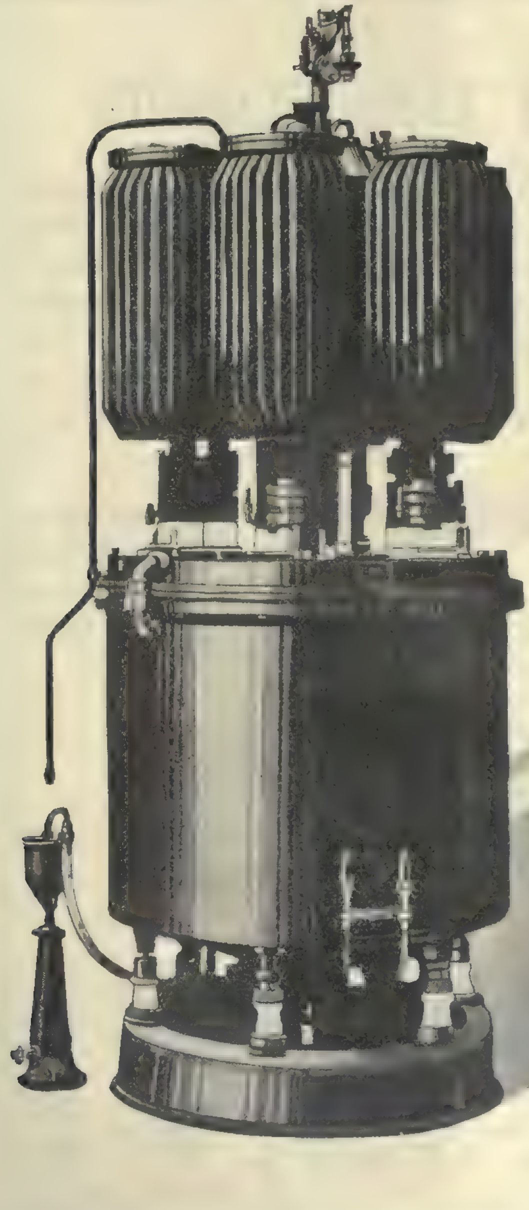
PHILADELPHIA
1010 Colonial Trust Building

MANUFACTURED IN TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

ABB

American
BROWN
BOVER

They ar



Principal Products

Mercury-Arc Power Rectifiers (steel enclosed)
Electric Locomotives—for any system of current, high or low tensions
Complete equipment for railway electrification
Rotary Converters
Motor Generators
Diesel-Electric Locomotives

Mining Locomotives
Switches, Controllers and all Auxiliary Equipment
Automatic Regulators
Steam Turbo Generators for normal or high pressures and superheats
Oil Switches
Condensers and Auxiliaries

Relays
Turbo Compressors
Blowers
Electric Furnaces
Induction Regulato
Ships
  Diesel Driven
  Turbine Driven
  Electrical Driven
Structural Steel F

ercury-Arc Power Rectifiers

ilent!

THUS one source of complaints is stopped by removing the cause. Freedom from moving parts, except small auxiliaries, insures absolutely quiet operation. Even when placed in the heart of the most congested districts no complaint of noise can possibly reach you.

As a matter of fact you can install Mercury-Arc Power Rectifiers anywhere. Place them in sub-stations of light construction, set them up in an old house, bury them under the street. They are low in weight. They require no special foundations. Maintenance is negligible.

Other chief advantages are these—

Efficiency high over the whole working range.
Simple operation.
No synchronizing.

Very high momentary overload capacity and insensibility to short circuits.

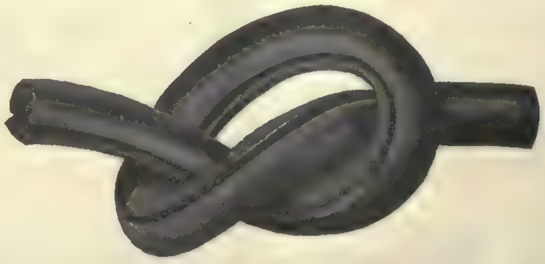
Were the only advantage, however, this freedom from noise, the throttling of complaints would alone be sufficient reason to install Mercury-Arc Power Rectifiers in preference to rotary converters.

Descriptive Circular No. 301 describes Mercury-Arc Power Rectifiers. Would you like a copy?

American Brown Boveri Electric Corporation
165 Broadway, New York, N. Y. Camden, New Jersey
922 Witherspoon Bldg., Philadelphia. 842 Summer St., Boston. 230 South Clark St., Chicago

AMERICAN BROWN BOVERI

PHONO-ELECTRIC OVERHEAD IS A MEASURABLE ECONOMY



You may never need to do this with trolley wire—

but such toughness
will stand the buffeting
of millions of car passes.

Imagine the mechanical strain on this piece of Phono Electric Trolley wire, tied into a knot while cold.

Yet it shows not the slightest crack or flaw. And the same test has been made many hundreds of times with equally convincing and satisfactory results.

Such toughness is one sound reason why Phono Electric consistently outwears hard drawn copper trolley wire two to three times.

It has enabled individual installations to chalk up "wire mileage" records of 2,000,000 and more car passes. Certainly a factor well worth consideration in planning a modern overhead for modern service.

We will gladly send you a copy of the Phono Book covering this and other features of Phono Electric Wires in detail.

Phono-Electric
The triple-wear Trolley Wire

Phono Hi-Con
Conductivity up to 80%

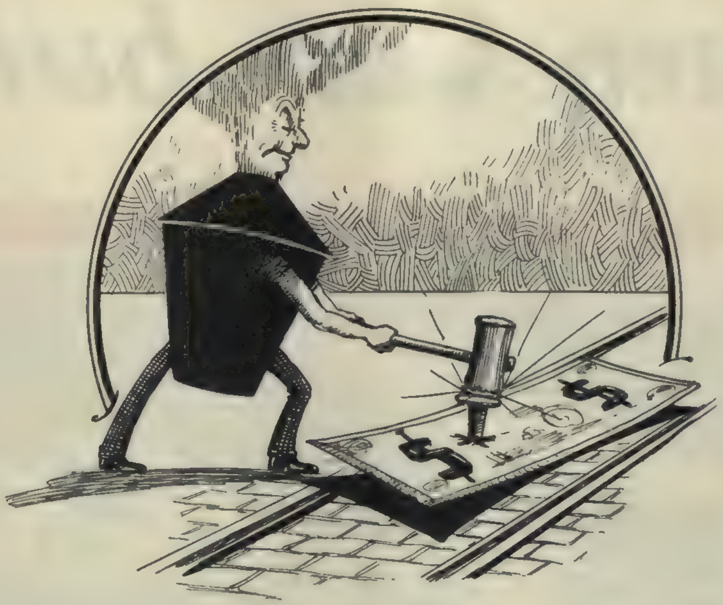
Phono Hi-Strength
the corrosion proof messenger

Bridgeport Brass Co

"Bridgeport"
BRASS TRADE MARK CO.

Bridgeport Connecticut

A COMPLETE WIRE SERVICE FOR ELECTRIC RAILWAYS



"The first cost is the last cost"

We want to hammer home this *big idea!*

A Thermit weld once made and paid for is no longer a source of expense. The rail joint is eliminated and a solid homogeneous piece of continuous rail takes its place.

Any other joint, no matter how carefully designed, is still a joint, and may ultimately work loose under pounding wheels. Then the pavement must be dug up and the joint repaired.

With Thermit Welds—"the first cost is the last cost," and the cost today is strictly competitive with other processes.

Why not put this big idea up to the men who control the policies of your company?

THERMIT WELDS

—Permit use of lighter rail sections.

—Eliminate the need for bonds.

—Make smooth quiet-riding track.

—Last as long as the rail itself.

—Are easy to install.

THERMIT

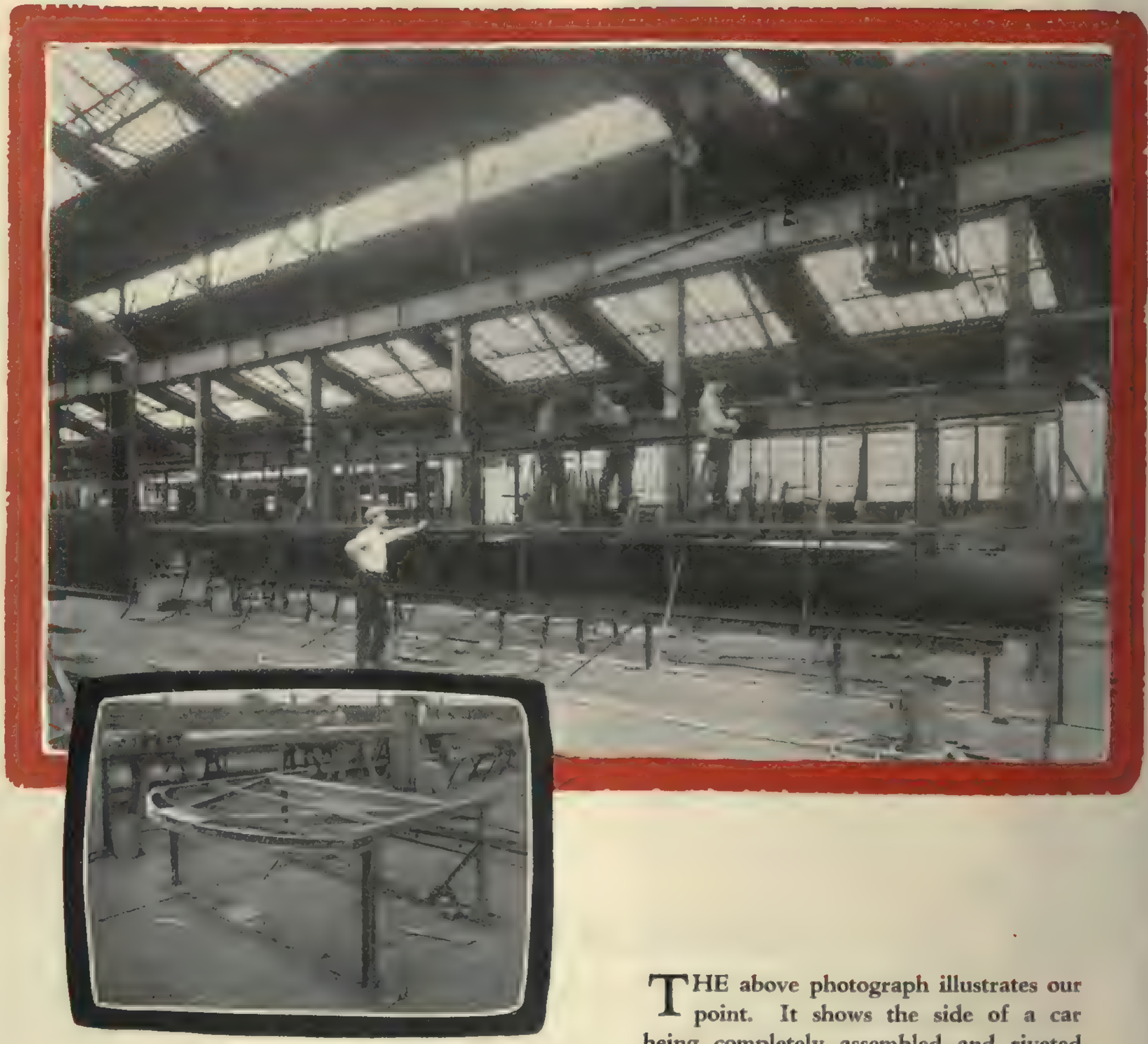
THERMIT

METAL & THERMIT CORPORATION

120 BROADWAY, NEW YORK, N.Y.

PITTSBURGH CHICAGO BOSTON SOUTH SAN FRANCISCO TORONTO

Modern Car-*building*



THE above photograph illustrates our point. It shows the side of a car being completely assembled and riveted on a jig. This method not only assures uniformly good workmanship in minimum time, but also makes the sides of the cars interchangeable. The inset photograph shows another type of jig used for assembling end underframes.

s essential as modern cars

How BALANCED DESIGN and UNIT CONSTRUCTION *save on your investment*

The need for modern cars has been well defined. The results to be expected from new car operation are no longer a matter of conjecture. Now let us consider the subject from a different angle.

For old time methods of car-building are as obsolete as the cars they served to construct.

This has been clearly demonstrated in working out the modern principle of BALANCED DESIGN. Only by boldly breaking with precedent in bringing design and construction under one competent control could the idea of an accurately "balanced" transportation unit be worked out. Carrying this idea a step further has resulted in application of the UNIT CONSTRUCTION plan to car building . . . standardization of major units, the use of jigs for all parts and greatly simplified assembly.

Thus when you buy Cincinnati New Cars of BALANCED DESIGN you make no experiments in adaptability—and you pay a minimum price for complete, uniformly efficient units.

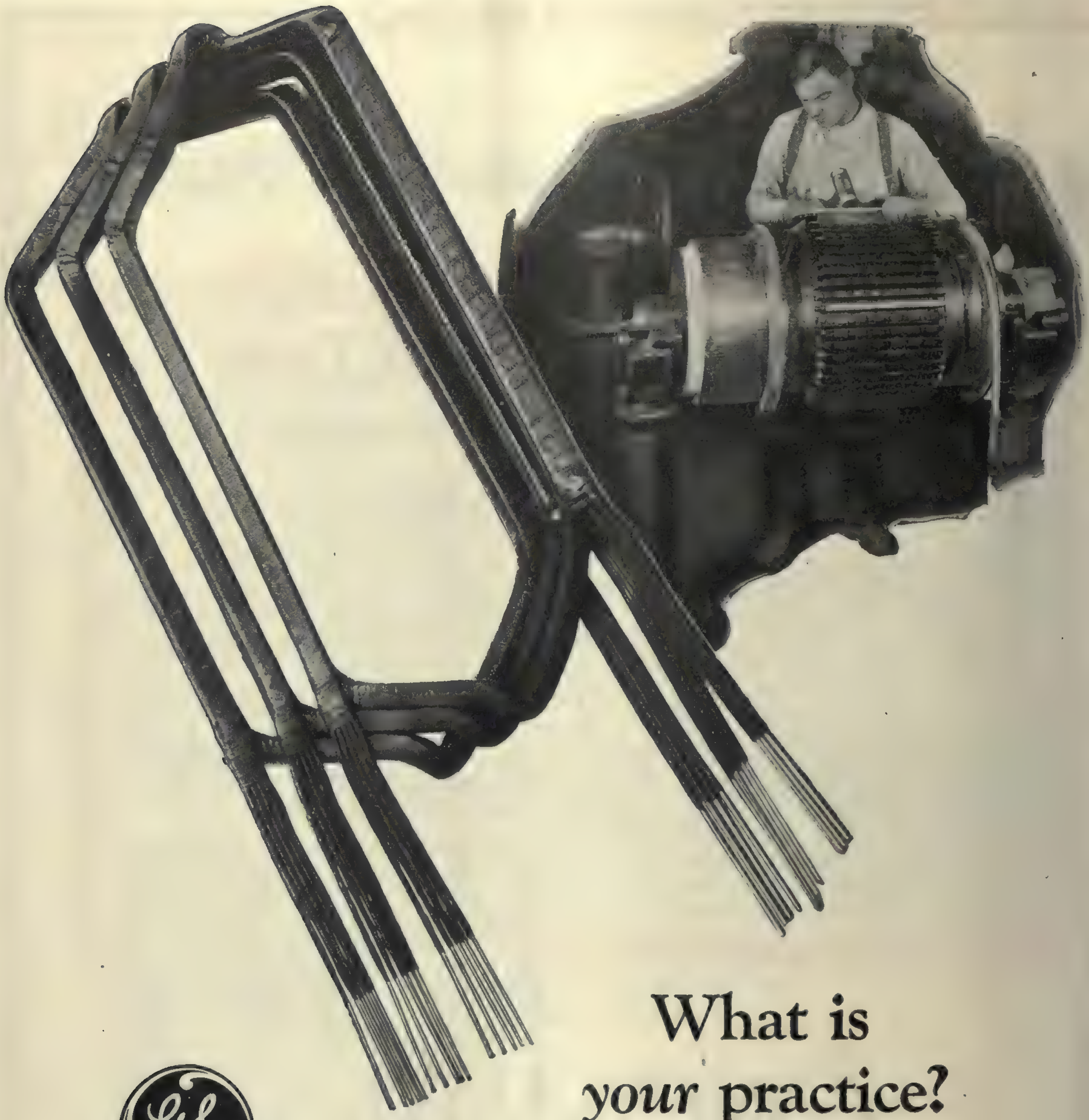
This we believe is *modern car-building.*

May we explain further its value in your own case?

CINCINNATI CAR COMPANY
Cincinnati, Ohio

CINCINNATI
New
CARS

A step ahead of the modern trend



What is *your* practice?

The cost of coils is only a part of the cost of armature rewinding. The winder's time and other labor must be considered. A small saving in first cost of the coils inevitably is more than offset by frequent rewinding with inferior coils.

The rewinding of G-E Motors to make them as good as new is an ideal achieved only by using coils of "original-equipment quality"—the kind furnished by the builder of the motor—the kind with slot portions moulded to exact dimensions and with insulation not only adequate but sized for a perfect fit to minimize rubbing and wear.

330-15

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

Volume 69 New York, Saturday, January 15, 1927 *Number* 3

In Helping One's Neighbor One Will Help Himself

SOME master mechanics appear to have a tendency to withhold from visiting master mechanics vital information pertaining to maintenance methods and practices being followed daily within the shop. This is a state of mind that never should exist. These same indifferent master mechanics when visiting the shops of other properties expect an open and frank outpouring of information with respect to the practices being followed—and if this is not forthcoming they feel very much offended.

At varying intervals throughout the year the managements of various companies expect their master mechanics to visit the shops of other properties to discuss maintenance problems and to obtain first-hand information regarding the maintenance practices being followed. Usually these visits prove beneficial, not only to the visitors but to the visited master mechanic as well. The discussion and exchange of ideas give birth to new ideas, resulting in a betterment of maintenance practices with lowered costs. Sometimes, however, little or no benefit is derived from these visits. This is the case when the master mechanic of the visited property will not show his goods in an open, frank manner and the information received by the visitors is obtained only by constant questioning and sifting out the short, curt or evasive answers.

What is the cause of this attitude? Perhaps the offender does not care to impart knowledge to other properties relative to his practices or he does not consider his methods as good as those being followed on other properties. Whatever the reason for this attitude, it should be changed. The sooner this is done the better it will be for the entire industry. It is only through the free and constant exchange of ideas on maintenance methods and practices that progress can be made.

So the Newspapers and the Public May Know

CERTAINLY reassuring is the statement to the press of Managing Director Storrs in review of the electric railway situation for 1926, released for publication on Jan. 10. There appears to be no need here to refer to all that he said, since some of the statistics have heretofore been matters of industry record, but it does seem well to reiterate that the gradual increase in traffic in the industry as a whole stood out in marked contrast to every other year since the war.

Particularly significant is his reference to the extent to which co-ordination is being carried out, the best part of which is the implication the statement carries of the readiness of the railways to do their share. It may even have escaped railway men that more than 7,000 buses now are being operated by approximately 275 electric railways over more than 15,000 miles of route. A doubter here and there may be inclined to scoff, but it remains significant, however, that, due to the joint effect of an increase in traffic and an increase in the average fare, the gross receipts of the industry have risen during 1926, an advance not offset by the increase in expenses. Mr. Storrs says quite frankly that the future of the small city railway is still a problem and that some interurbans, which never should have been built, are not doing so well.

It was very much to the point for Mr. Storrs to indicate that outstanding problems of the industry are traffic congestion, which slows up cars; taxes, which are the highest imposed on any industry in the world, and the increase in the use of the private automobile in daily business. He is correct when he says that managements generally are approaching these problems progressively. They are effecting operating economies, using paid advertising and other proved forms of salesmanship, and on the whole are confident of the future.

Nothing but good can ever come from the reiteration of the facts of the industry as Mr. Storrs has made them available to the newspaper reading public of the country.

Many Special Machine Tools Being Built

INCLUDED in the equipment of the department of electrical repairs of the new Coney Island shops of the Brooklyn-Manhattan Transit Corporation's lines, as discussed in this and the Dec. 18, 1926, issue of ELECTRIC RAILWAY JOURNAL, are a number of new universal machine tools. These permit the performance on an armature, without removing it from the machine, of several operations, such as banding, turning, slotting and finishing of commutators and truing up of shafts. The turning of new armature shafts is done in a multiple carriage lathe with several tool posts on each carriage.

This tendency toward the production of special machine tools was commented upon by the machine-shop practice division of the American Society of Mechanical Engineers in a report presented at the annual meeting in December, 1926. Builders of standard equipment are fitting their machines with attachments particularly needed to do some special job, and in addition a great many purely special machine tools are being built. Some examples given were the multiple-spindle drillers and multi-head millers. In some cases machines are

This is the issue in January that is devoted essentially to maintenance and construction subjects

supplied which employ standard heads and parts, but in other respects the construction is special. Hydraulic feeds have been included in new machinery by several designers. In some types the power is supplied to the hydraulic cylinders in the machine by oil under pressure from an accurately controlled pump.

In the review of machine-shop practice there appeared a direct tendency toward increased use of individual motor drive. Practically every machine-shop tool now built is provided with motor drive, or at least has it as optional equipment. This applies to small machines such as drillers, tappers, etc., as well as to the larger units. Motors are being designed as a part of the machine tool rather than being added as an afterthought, and in some types motors are built directly on the spindles or are geared directly to them.

Another tendency in machine-tool manufacture is toward better bearings. Ball and roller bearings are being employed more than previously. They were used first successfully on intermediate shafts, but now their application is extending to main spindles. Improved lubrication is another feature. Flood lubrication by pump or splash is the rule in the latest type lathes, drillers, milling machines, etc.

In new models of machine tools considerable attention has been given to their control and to facilities for chucking and feeding. These include fast table movements on milling machines, treadle control of work-heads on grinders, push-button control and the bringing together of all control handles within easy reach of the operator.

Knowledge of Improved Methods Needed by Electric Railway Shopmen

QUITE generally it has been considered that the work of car inspection does not require highly skilled mechanics. To a certain extent this is true; a considerable part of it can be done by semi-skilled labor. But experienced mechanics and electricians with previous knowledge and actual training enabling them to determine when work is done properly will prevent many failures of equipment, thus forestalling annoying delays and expense. If a check be made of the average force employed in the inspection of cars few men will be found who have served an apprenticeship at a regular trade. Usually a man has drifted into a railway shop and been put to work as a helper. By sticking to the job, principally because it was a job, he progressed to the position of repairman or gang leader. Having learned the work from the men he helped, if this was done wrong the errors have continued.

To those who have investigated the matter it is apparent that more attention should be given to instruction and training of electric railway shopmen. Employees in subordinate positions must be given an opportunity to secure all possible information about the work they are doing and foremen must be made familiar with the best practices of other shops. Executives and men in the more important positions should be made to understand the necessity of supplying to the men who are actually doing the work information regarding desirable practices. They should also be led to think for themselves and to devise improved methods for doing the work better.

Training of apprentices is another phase of the improvement work that should receive attention. Some of the larger railroad companies have established apprenticeship courses. On the New Haven railroad helper apprentices are recruited from the force of helpers who have already served two years with the company in that capacity. Simple but thorough examinations are given regularly to show the amount of advancement that is being made.

Shop methods, processes and the tools used for the repair of car equipment become obsolete in time. There is a wide field for modernization in electric railway shops. Much of the need has come from the attitude toward the shop employees that has been discussed. So, on the other hand, a plan that will give a modern frame of mind to the workman is an essential factor that must go along with or even precede the physical modernization.

Increased Maintenance Expense May Come from Unexpected Sources

LACK of business intimacy between heads of departments and their subordinates, as well as between heads of departments in general, invariably is a fundamental cause of unpleasant working conditions, undesirable friction, and finally a tremendous financial loss to the operating organization. This is often caused by petty arguments, jealousies or the unwillingness of foremen or department heads to assume responsibility for faulty workmanship or failures.

All this has a far-reaching effect. It not only hampers production but results in the production of materials of a quality inferior to that required and at a greater expense. Increased road failures result, with corresponding delays, loss of public confidence and reduction in revenue. This condition cannot be corrected until every employee of the railway recognizes that he has a personal interest in the success of every other member of the organization. Without this mutual understanding the industry cannot grow. When some member stands back and refuses to co-operate with his fellow worker in the performance of his duties, or the advancement of modernization of ideas or methods, then this individual acts as a retarding force and tends to slow up the progress of the entire organization.

As an illustration, consider one specific instance. The machine shop and the controller shop of a certain property are each headed by a foreman reporting to the superintendent of equipment, so that the two departments are independent of each other. To effect a saving in material, the controller shop foreman decided to cut down certain burnt controller segments in order to permit of their use in positions where shorter segments were needed. This work was being performed in the machine shop. Due to the tactics used by the controller shop foreman, the machine shop foreman was offended and as a result he refused to perform the work. Not wishing to intensify the existing hatred, the controller shop foreman for the time being abandoned the use of reclaimed segments and set about to manufacture a machine capable of cutting off and rebuilding the segments as was done in the machine shop.

What was the result? He had shown a material reduction in cost due to this reclaiming process and naturally did not want to go back to the use of new material, on account of the expense it would entail. Since he did not have any other way to keep the cost down while he was experimenting with the new machine, he was tempted to stop removing the burnt segments for the time being as had been done previously. As a result there was a far greater expense on account of a large increase in road failures.

When the machine finally was constructed he was able to recondition the segments in his own shop. But the device developed by him was extremely crude and the cost of manufacture was exorbitant, as compared with what it should have been had he used a new machine readily procurable in the open market.

This one instance of lack of understanding certainly bred a great deal of trouble and tremendous expense. All this could have been avoided had the proper means of reconciliation been provided.

Public Utility Success Needs Good Faith of the Public as Well as of the Utility

LOCAL transportation service in Newark, Ohio, was shut down a number of months ago after the City Council repudiated its own grant of a new franchise to the railway by giving paralleling rights to an independent bus concern. This last move came after the Southern Ohio Public Service Company in good faith had purchased the old set of competing bus lines as a part of the unification and modernization plan for the improvement of the property.

The outcome as it stands to-day is far from representing the will of the people. When the company announced that it would suspend service as of midnight, Aug. 10, 1926, following the granting of the competing bus franchise, mass meetings were held, and since then the business men of the city have tried in many ways to undo the damage. It has been found, however, that the bus franchise is as valid as that which was granted to the electric railway, and the Southern Ohio Public Service Company has quite properly refused to sustain the further losses resulting from operation on a competitive basis.

Just 60 miles to the east lies Zanesville, only slightly larger in population than Newark, and heretofore served by the same company that also operates interurban and coach service between these cities and Columbus. Even before the fiasco in Newark, Zanesville had passed a modernized ordinance extending the franchise to the Southern Ohio Public Service and that company had proceeded with the rehabilitation of track and had purchased and placed in operation 20 modern and finely appointed cars and several high-grade buses to serve newly developed territory. The same general plans were offered to Newark, so that there were no grounds for doubt as to the integrity of the company. Zanesville had solved its problem months before Newark upset hers.

The Newark situation was discussed in this paper last August. It is brought up to date elsewhere in this issue. Later developments indicate but little change and it appears that *finis* is to be written to the street railway history of Newark. Through hasty and unwarranted action, upward of a million dollars has been sacrificed to the political selfishness of the clique in power. The clique will soon be forgotten, but the black mark against industrial integrity on the city will be a heritage that will long remain.

Off-Street Parking Facilities Must Not Be a Subsidy

STUDIES by Dr. Miller McClintock, director of the Erskine bureau, reveal the woeful inadequacy of curb space for parking purposes. In Chicago, on the basis of a 100 per cent turnover every 30 minutes, only 15 per cent of the automobiles that daily enter the loop can be accommodated in the Loop district even for so short a time. What is true of Chicago, as shown by the survey of the Chicago Association of Commerce presented in the Jan. 8 issue of the JOURNAL, is likewise true of other great cities as well.

On the other hand every railway man knows the tremendous hindrance that this parking evil creates to all manner of moving vehicles. It is the direct cause of slowing up moving traffic not only of automobiles but, more important, the mass transportation vehicles as well. Merchants, due to erroneous assumptions, have long felt that parking facilities in front of their respective business establishments have been a drawing card to prospective patrons. This recent finding on the part of the Erskine bureau in the light of studies recently made in Chicago, Cleveland and other cities attaches less weight to this mistaken theory.

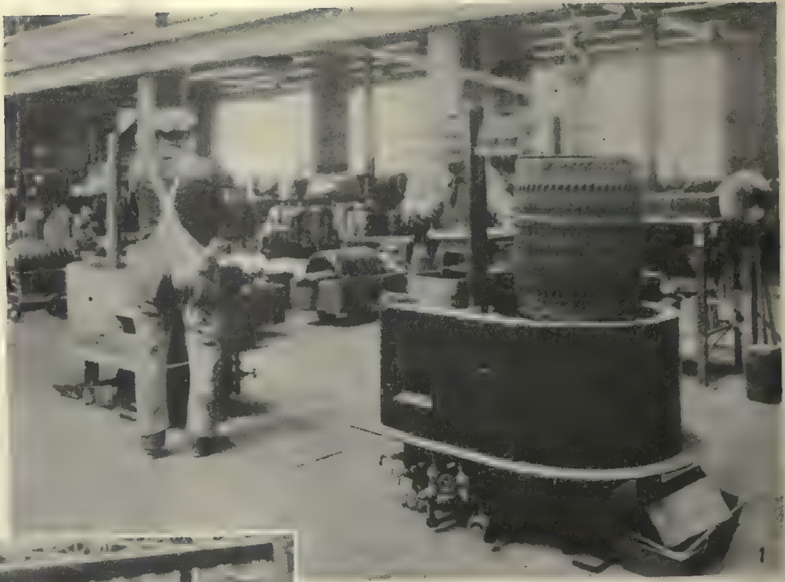
When it is realized more fully that this accommodation of the few is of such disproportionate value to the service of the many, still less value will be attached to street parking facilities. With the full width of busy streets available for moving vehicles, mass transportation could be improved in speed and in this way perform a service to a far greater number of people than is possible at present.

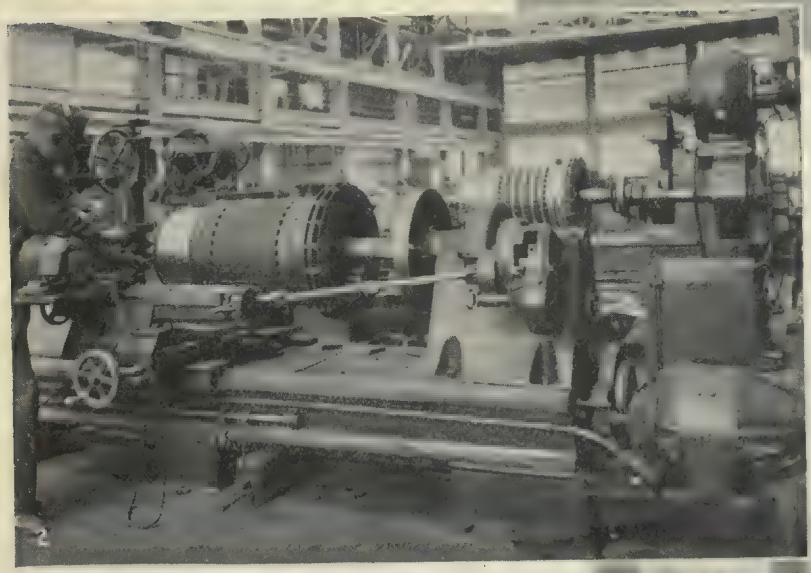
To this end the suggestion of Dr. McClintock, detailed elsewhere in this issue, to provide convenient off-street storage areas is of great value. An element of possible danger, however, arises from the suggestion that such storage facilities be constructed from public capital and charged for at reasonable rates. The possible idea must not be tolerated that such rates can be anything less than the full cost of providing such accommodations. The free use of the streets for parking purposes existing for so many years may well lead to the thought that the storage of private cars in garages erected out of public funds should be a partial gift to the public. Such a condition would be only a subsidy to the private automobile owner and would be directly unfair to the riders on electric railways. In most cities the car riders not only do not enjoy a subsidy, but actually subsidize the city in providing street paving and other forms of taxation that are of no direct benefit to the car rider. In Chicago, for example, the public improvements paid for by the Surface Lines riders have amounted to $100,000,000 in 20 years.

Depending on its value the land used for car storage buildings will be worth from $1 to $5 per square foot annually. Assuming that a car will require at least 100 sq.ft. for storage, aisle and ramp space, this will entail a charge of $100 to $500 per car annually.

All that the electric railway may expect is fairness. The industry today is competitive, although all too few realize this condition. The operations of the companies in city streets are hampered to an ever-increasing extent by the pitiful few who are benefited by curbstone parking. A ban on parking will allow a distinct improvement in service, but the railways must resist, as taxpayers, any attempt to provide this relief at public expense.

Modern Machines Facilitate Maintenance Work in New Shop for Brooklyn-Manhattan Transit Lines





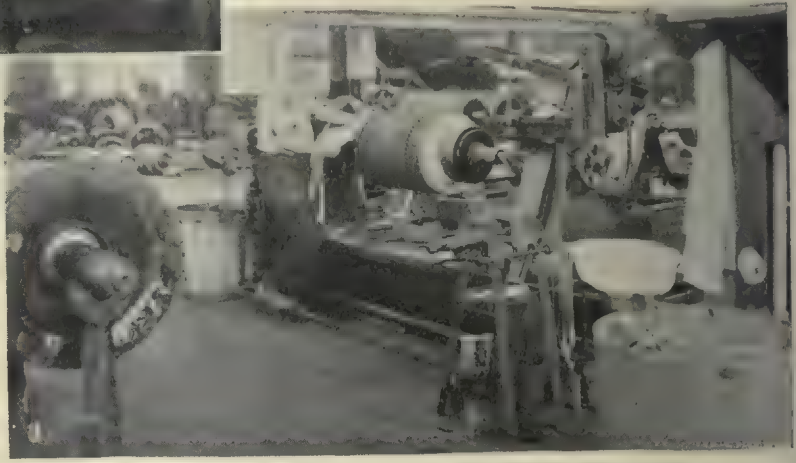
No. 1. Dipping armatures in soldering pots to solder connections at commutator neck.

No. 2. Banding, slotting and turning operations can all be done in these universal lathes.

No. 3. Applying canvas hood to the pinion end of armature windings.

No. 4. Slotting a commutator by means of an individual slotting machine.

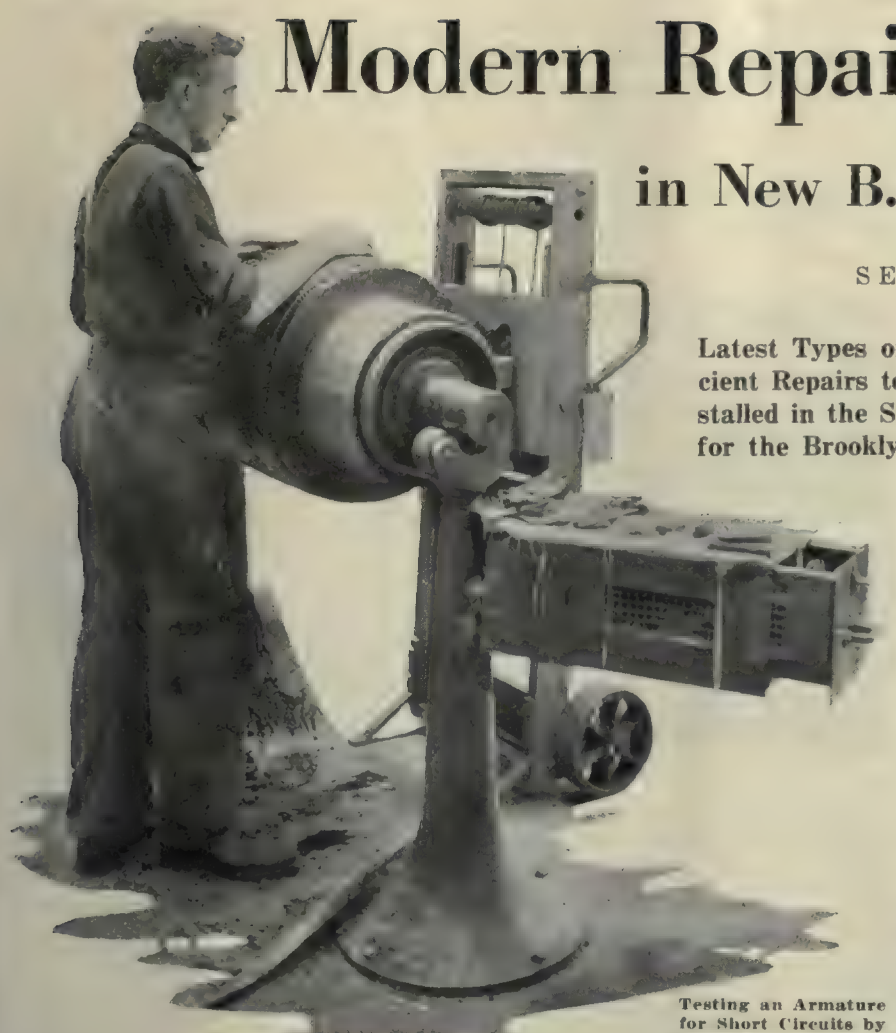
No. 5. Commutators are trued up by taking a slight cut and are then sandpapered and polished.



Modern Repair Methods in New B.-M.T. Shop

SECOND ARTICLE

Latest Types of Tools to Insure Rapid and Efficient Repairs to Electric Car Equipment Are Installed in the Shop Devoted to Electrical Repairs for the Brooklyn-Manhattan Transit Corporation



Testing an Armature for Short Circuits by Means of the Buzzer Test

SELECTION of the best available practices for repairing electrical equipment of cars has made the new shop of the Brooklyn-Manhattan Transit Corporation outstanding. Devices have been installed to do the work quickly and with a minimum of physical effort. While many of the pieces of apparatus are fairly common in large railway shops, the combination of them in one carefully planned layout is unique. For this reason considerable attention has been given in this article to a discussion of the individual tools and devices.

Armature leads are connected to the commutator bars by the pot-soldering method. All oil, dirt, insulating material and paint are removed when the commutator is repaired and the slots in its neck are cleaned and carefully tinned before the coils are inserted in them. The soldering is done in two General Electric soldering pots installed in section 6 of the shop, which has a concrete floor. Provision is made for two additional pots.

The soldering pots, two of which are shown in the illustration on page 108, are standard equipment in a number of large shops. There are two compartments side by side, one in which the soldering is done and the other a reservoir in which the solder is kept molten by gas flames. The soldering compartment has a hollow center in which the commutator is placed, so that it projects below the solder and does not come in contact with it. A sheet metal ring laid on the opening in the center has a hole of such diameter that it just lets the commutator pass through. A collar of asbestos tape placed around the commutator about 1 in. from the neck makes a solder-tight connection. The space between the asbestos collar and the neck is painted with a mixture of whiting and alcohol to prevent the solder from adhering.

The armature is handled by means of a crane, a hook fastened to the pinion end holding it vertical with the commutator end down. It is placed in position in the pot and then the solder is forced around the neck by depressing a plunger in the reservoir. While the solder is around the commutator the neck is raked with a wire brush to insure good contact and union of the solder and copper. After several minutes the hot solder is drained from the central portion by raising the plunger in the reservoir and the armature is removed. With the pot method of soldering the leads of an entire armature can be soldered in one operation, without danger that any excess solder will work back of the commutator neck.

The frequency with which an armature is tested was detailed in the previous outline of armature work. Three types of testing apparatus are used, the bar-to-bar test equipment, the high-voltage test and the buzzer test.

Two types of bar-to-bar test equipment are used. One has a variable resistance and the other a lamp circuit. In either case an ammeter is connected in series.

THE first article on the new electrical repair shop for the Brooklyn-Manhattan Transit Corporation's lines was published in ELECTRIC RAILWAY JOURNAL for Dec. 18, 1926. It contained information on building, construction, size, lighting, heating, arrangement of departments, plan for routing work, equipment cleaning methods, ovens for drying and baking and vacuum impregnating methods. In this, the second and final article on the electrical repair shop, various departmental operations are discussed, such as testing, soldering, banding, turning, slotting and polishing of commutators, general machine work, locker and washroom conveniences for employees. Articles relating to the other shops which will compose the Coney Island group will be published as soon as the remaining buildings are placed in service.—EDITOR.

Leads placed on two adjacent commutator bars are used to explore the coils and locate trouble, a millivoltmeter giving the indication. The 600-volt shop system is used as the source of supply. High-tension tests are made by the portable transformer box already referred to.

The buzzer test to detect short circuits and grounds is made with standard Westinghouse Electric & Manufacturing Company equipment. This consists of a laminated iron core in which an alternating magnetic flux is set up. The exciting coil is energized from the shop a.c. circuit. The core is mounted on a wheeled stand which readily can be moved up to an armature undergoing repair and on which the tests are to be made. A windlass permits of raising or lowering the cross head which supports the laminated core so that it can be shoved against the armature as it rests on the usual type of winding stand. In this position, with the laminated core energized an alternating flux passes through the armature. If the condition of the armature winding is correct the electromotive forces generated counterbalance each other and no current passes through the winding. A short-circuited or reversed coil will cause a local current and a flux around the slot in which the coil lies. A piece of metal or a knife blade passed around the commutator will then short-circuit in succession each of the coils that have one side under the testing pole. If there are no faults in the winding a decided spark occurs as the knife blade leaves each bar. Absence of spark between two bars indicates a short circuit, an open circuit or a reversed coil in the winding.

Above—Removing Insulation and Straightening Armature Coils

At Left—Strap-Wound Armature Coils Are Tied in Bundles Convenient for Handling and Are Placed in a Lye Tank for Removal of the Insulation. The Solution Is Heated by Steam from a Flash Boiler

A short-circuited or reversed coil due to the local current induced in it will generate a flux, which can be detected by moving a piece of sheet iron held lightly over the surface of the armature core so as to bridge from one tooth to the next successively. The local flux caused by a short circuit or reversed connection will attract the piece of iron when it bridges across the slot containing the defective coil. As the sheet iron is thus caused to vibrate the test has been termed the "buzzer." If no local flux is detected the fault disclosed by the sparking test is due to an open circuit. This testing equipment is suitable only for use with wave-wound (two-circuit) armatures, as the equalizing connectors on lap or multiple-wound armatures would make the entire winding appear short circuited.

For testing equipment the shop is wired for 110 volts alternating current, with outlets in the pedestals of the armature winding section and at other convenient intervals. The alternating current is supplied by a General Electric synchronous converter, installed together with the necessary switchboard equipment at one side of the shop adjacent to the office.

Banding of armatures and turning and slotting of commutators are done in section 7, which is equipped with four special lathes. One of these is a Peerless universal slotting, banding and commutator turning lathe. There are also two Le Courtenay combination banding and turning lathes, one of which is equipped with a commutator slotting attachment. The fourth lathe of this group is a small Peerless slotting and banding lathe, which is used for small armatures such as are used for air compressors. The banding equipment also includes a separate band tension machine made from General Electric Company's design by the railway, which provides for accurately weighing the tension used for banding. With the large size subway motor armatures such as are used by this company, a banding tension of 400 lb. is required. These machine tools are designed particularly for electric railway work and the economy of being able to do banding, commutator turning, commutator slotting and, in fact, all machine work on an armature in one set-up will be appreciated by railway repairmen.

For turning shafts already installed in armatures and for cutting threads on the end of the shaft for the pinion nuts a 26-in. lathe made by the Monarch Machine Tool Company is used. This size is needed in order that the lathe carriage may pass underneath the commutators of the large armatures. This lathe can also be used for turning commutators if the volume of work makes it necessary.

Above—A Large Number of Hot Presses Are Used for Armature Coil Work
At Right—Shaping Coils for Reinsulation

An 8-in. Lo-Swing lathe is used for turning new armature shafts and also for turning the tapers on armature shafts. This lathe has two carriages and two tool posts per carriage. All work on an armature shaft can be done in this lathe except the cutting of threads and keyways. Two machines are provided for keyway work, one a No. 3 Little Giant horizontal key seater and the other a No. 5 vertical key seater. The vertical key seater is used for cutting keyways inside armature spiders and in other places where the keyway is inside an opening. In the table of machine tools now installed in this shop will be found listed several other machines necessary for various repair operations and for keeping the cutting tools in proper condition.

All of the armatures used in rapid transit service for the New York Municipal Railway Corporation have strap-wound coils. After removal from the armatures the coils are taken to section 8 for reclamation. The first operation is removal of the insulation. The coils are bundled up in lots convenient to handle and are put into the potash tank. After immersion for two or three hours, the coils are taken out and one edge of the softened insulation is cut off. They are then returned to the potash tank and left overnight. The insulation can then be scraped off with a knife. After washing, the coils go to a bench for shaping, care being taken not to separate the three coils which go together in winding.

The potash tank is made of sheet steel with a frame and supporting legs of angles. It is 6 ft. long, 30 in. wide and 18 in. deep. Steam pipes are run around the inside of the potash tank. The solution that is used in this tank when put in fresh is made with 6 lb. of potash to 50 gal. of water. The solution is continued in use by adding 1 lb. of potash each day. A small washing tank, 28 in. x 18 in. x 10 in. deep, is provided at one end of the potash tank. The lye solution is kept hot by steam from an 8-hp. flash boiler, manufactured by the P. M. Lattner Manufacturing Company. Steam from this boiler is also used for the hot coil presses installed on the balcony in section 14 immediately above the boiler. This boiler burns gas at a low pressure, regulated automatically to keep the steam pressure at 60 lb.

There are several operations in the straightening of the armature coils. The leads and sides of the coil are straightened in a vise and they are brought back to their original shape by placing them on forms and hammering with a wooden mallet. It is also necessary to remove carefully any rough spots and sharp edges, after which the coils are retaped and are then dipped and baked for reuse.

FIELD COIL TEST METHODS

Section 14 of the shop is also used for all field coil repairs, which consist mostly of putting on new insulation and new leads, which are placed on all coils which come in for repairs. After repair, each field coil is given a short-circuit test. In this the field under test acts as a secondary of a transformer, the primary coil of which has a circuit breaker, ammeter and a double-pole, single-throw switch. In making the test, a reading is taken on the ammeter and the switch is closed with-

Section Devoted to Controller, Switch Group, Brush-Holder and Other Detailed Equipment Repairs

out a field coil in position for testing. This reading gives the primary current of the transformer when the secondary is open circuited, which will be unchanged if the field coil under test is in good condition. A reading higher than normal indicates that the field coil has a short circuit, the reading varying with the number of turns that are short-circuited. If the test is continued for a sufficient length of time the location of the short circuit will be indicated by heating. Coils are tested for open circuits by grounding one terminal and applying a lamp circuit to the other.

All field coils are impregnated. The coils are dipped twice and baked. They are also subjected to a 2,000-volt test before being returned to service.

All coil winding and taping is done on the mezzanine, which contains the latest type equipment needed for this repair work. This department also contains a large number of hot coil presses. These are mounted on an angle framework, with the various valves and piping for steam heating carried underneath. Parts are transported to and from the mezzanine through a hatchway.

Most of the employees in the coil-winding and taping department are women. A restroom is conveniently located in the center section of the mezzanine which is fitted up with space for lockers, etc. The east end of the mezzanine is used for the repair of fare registers and passimeters used in subway service.

On the main floor of the shop, in addition to the departments already described, a space 32 ft. x 40 ft. in the southwest corner is partitioned off as a foreman's

At Left—All Field Coils Received for Repairs Have New Leads Installed. At Right—Winding New Armature Coils

Circular Wash Fountains Are Provided for Workmen

office. Near the east end under the balcony a large room has been reserved for equipment and later will be used as a testing laboratory. Provision will be made for tests on all kinds of materials used in electric railway construction and operation. The east end of the shop, supplied with an abundance of light, is used for the repair of controller equipment, contactors, switch groups, line switches, magnets, door-operating equipment, brush-holders and other small parts.

A feature of this shop is the provision of storerooms for supplies located conveniently to the point at which they are used. Section 2 is a small storeroom for controller parts, and at the other end of the room is a storeroom for other parts used in the department of electrical repairs. This has two floors and the material used in the coil winding and taping section is carried on the second floor.

A men's locker and wash room is provided in the center of the shop underneath the mezzanine. This is equipped with four Bradley wash fountains of latest design and two shower baths. The lockers are of all-steel construction, made to the company's specifications. Water for washing purposes is heated by a Ruud automatic multi-coil storage heater, regulated by thermostatic control. At convenient intervals throughout the shop are a number of Halsey Taylor drinking fountains. These have a large ice receptacle, 18 in. diameter x 18 in. high. The fountains are set on a pedestal with the top of the bowl about 40 in. above the floor. The drinking bowl is of porcelain. Water is turned on against a slight spring pressure, and is automatically shut off when the handle is released.

Kansas City Reconstruction Program Well Under Way

Eight Miles of Track Was Reconstructed or Built New Following the Lifting of the Receivership on Oct. 15 and Before Cold Weather Set In

REHABILITATION of the Kansas City Public Service property is one of the outstanding duties of the new management. An urgent program of some 8 miles of city track was started last October and completed in approximately two months, the total expenditure involved being $354,870. A part of this cost was for the dismantling of the superstructure of the elevated road.

This is the first step of a $6,600,000 program of rehabilitation planned by the new owners under the leadership of President William G. Woolfolk of the William G. Woolfolk, Inc., engineers of Chicago, Ill.

The receivership was officially terminated on Oct. 15, but in order to get the most urgent work done before winter, permission was obtained to start the work on Oct. 11. Very little material was on hand, but rush orders were placed within a week, and no serious delays in the several jobs were encountered as material was received promptly. On Oct. 11 400 men were employed and on the following day this force was doubled and work was started at six locations.

During the receivership a standard type of track construction was adopted which will be continued. This consisted in the use of 7-in. tee-rail, Lorain section 93

Part of the Initial Track Reconstruction Program in Progress on Troost Avenue, Kansas City. The Standard Construction Is 7-In. Tee-Rail on International Steel Ties Imbedded in a 14-In. Concrete Slab

Putting on the Concrete Wearing Surface on Main Street, Kansas City. This Is Part of a Rush 8-Mile Reconstruction Program Completed Within Eight Weeks Following the Termination of Receivership Last October

No. 507, supported on International steel ties imbedded in a 14-in. concrete slab. The rails were canted 1 in 25. The base concrete consisted of a 1-3-6 mix. It was first poured up to the base of the rail and after the initial set concrete was tamped firmly under the tie plates and under the rail base. After this, concrete was poured to within 2 in. of the top of the rail and again thoroughly tamped against the web of the rail. Following this a 2-in. wearing layer of concrete using a rich mixture of 1-2-3 was placed and finished with an electric tamper and finishing machine. The work moved on smoothly, so that at the end of the construction period early in December approximately 1 mile of paved track had been constructed each week. This was considered a good record of progress in the face of the shortage of material when the work was undertaken in October.

KANSAS CITY TRACK RECONSTRUCTION IN THE TWO MONTHS FOLLOWING END OF THE RECEIVERSHIP

Location	Feet Single Track
Main Street, 40th to 43d	3,320
Grand Avenue, 20th to south end Viaduct	920
Main Street, Armour Boulevard to 39th	5,250
27th Street, Indiana to Cleveland	2,530
Troost Avenue, 31st Street to 37th	7,500
S. W. Boulevard, 19th and Main to Broadway	3,510
Main Street, Linwood Boulevard to Armour	3,140
Ninth Street, Mulberry Street to James	5,700
State Line, Olathe Boulevard to 45th	2,600
Country Club Line, 65th to 75th (new second track)	5,010
Total track reconstruction	39,480
Total cost for 7.5 miles	$338,800
Dismantling elevated road structures and double track	4,530

In most of the locations street car traffic was carried at one side of the street during the reconstruction of the tracks. The work was done under the direction of A. E. Harvey, engineer of construction. The 8 miles just completed is only a forerunner of many more planned for this year's program. The company has just announced its intention of reconstructing 23 miles, beginning as soon as weather permits.

Government Active in Standardization Movement

STEADY development has been shown in the fifth year of Mr. Hoover's division of simplified practice. About fifty simplifications have been carried through. These include a wide range of commodities. In a survey of nineteen of these commodities it is stated that from 51 per cent to 99 per cent of the sales are in accordance with the simplified practice recommendations, the average of the nineteen being 79 per cent.

The unification of government specifications under the federal specifications board has now reached a point where the main lines of government commodities are covered. More than 400 specifications have been approved, and a considerable number have reached the second edition. While contact with industrial groups has been maintained in the work, to a very considerable extent through the A.E.S.C., much yet remains to be done in thoroughly co-ordinating these government specifications with those in general use in the industries.

The bureau of standards has proposed an interesting plan of certification under which any manufacturer who is willing to supply goods made to comply with a given government specification may file with the bureau a statement to that effect. Consumers upon request will be given a list of such manufacturers. This plan has been widely discussed in a large number of organized industrial groups, since this proposal in some form may ultimately have far-reaching effects upon sales policies and upon our present method of distribution.

Better-Appearing Cars Needed

Electric Railway Industry Has Accepted the Challenge for More Attractive Rolling Stock—New Equipment Should Be Provided Where Possible and at the Same Time Increased Attention Must Be Given to Sprucing Up Existing Cars

MORE attractive cars were given consideration at a meeting of the rolling stock committee of the American Electric Railway Engineering Association held in New York Dec. 13 and 14. A resolution was adopted directing attention to the need of more attractive rolling stock. The opinion was voiced that concentrated effort in an attempt to acquire new rolling stock was not enough, and that there still existed a large field for improving existing rolling stock to provide more comfort, greater conveniences, increased safety and more attractive appearance. Many railways are rehabilitating existing cars which still can be operated economically and are providing these with improved devices and devoting particular attention to producing a trim, neat appearance by stream-lining in the car body construction and by attractive color schemes in painting.

The problem regarding rolling stock that is now presented to the electric railway industry is first to provide new equipment where possible and second to bring existing rolling stock which still possesses some useful life to a higher standard of attractiveness by incorporating in it as many of the splendid ideas as possible which are now used in new car designs.

We are living in an age of prosperity and the patrons of electric railways look for increased comforts and conveniences in cars over what was considered adequate a few years ago. The public has awakened to the idea that a higher fare is needed to pay for the added attractions and it is willing to pay it. The physical equipment of the railways must be made capable of giving the character of service demanded.

The rolling stock committee decided that the publication of articles discussing methods which have been used successfully by various railways in bringing existing rolling stock to greater usefulness was desirable. Various members of the committee volunteered to tell of results which have been accomplished on their properties, or of ways in which cars can be spruced up and be provided with added conveniences. In addition, any operator who believes that more attractive rolling stock will produce results was invited to express his views for publication. Two of the articles giving suggestions for the improvement of existing cars follow.—EDITOR.

Study Car Equipment with Reference to Appearance, Comfort and Convenience

BY W. R. MCRAE

Superintendent of Rolling Stock and Shops Toronto Transportation Commission, Toronto, Canada

FUNDAMENTAL ideas behind improved cars are to increase the passenger sales value of the rolling stock, to attract a greater volume of traffic than at present habitually patronizes a particular road, to increase the car riding habit and to induce people by every seductive method possible to abandon other competitive means of transportation.

If it were possible, the logical solution would be for a railway to replace the old and out-of-date rolling stock with new, incorporating the many splendid ideas now available, but there are few companies in this happy financial condition. With this done, it would be a comparatively easy matter to keep these cars in a condition with regard to appearance and comfort that would be a continual delight to the traveling public. The problem before the industry just now, however, is not only the design and evolution of new rolling stock but also the inclusion of as many as possible of the helpful ideas for additional comfort, convenience and attractive appearance to existing rolling stock.

The most difficult problem in connection with improvements in comfort, convenience, safety and appearance of cars does not occur so much on roads that operate in the large centers of population, and which are fairly strong financially, as to the owners of small railways which are waging a strenuous fight against all kinds of modern rubber-tired competition and with a comparatively low number of potential riders on whom they have to depend for revenue and their continued existence. There are many ways in which such roads can augment materially their revenue by careful attention to many of the suggestions and ideas that have been collected by the A.E.R.E.A. committee on this subject. Many of these roads are not in a position to go in for heavy capital expenditure and quite a number of the committee's ideas can be carried out at no very great expense.

The upholstered type of seat is the thing, undoubtedly, to adopt for the smaller railway with the attendant competition factors. A smooth and well-maintained track is a most important factor in easy riding quality of the car and systematic maintenance and inspection are necessary.

In dealing with the problem of comfort, one factor that is stressed in the committee's report is the discomfort and annoyance caused by improper handling of equipment in starting and stopping. In this matter, too little attention is sometimes given to the important factor in this operation—the human element, and the instruction of operators. Any additional comfort a passenger might derive from cushioned seats and more silent cars will be eliminated if the car is in the hands of an operator who, through lack of adequate instructions and training, or through carelessness, operates his car with jerky starts and stops. The training of a motorman is thus a large factor in the subsequent smooth and economical operation of the car. The establishing and equipping of a school of instruction for this purpose, with regard to the peculiar needs of the railway, would be an excellent investment for any electric railway. The expense involved is comparatively small and the results are felt ultimately in many ways.

The treadle-operated exit door, no doubt, has been instrumental largely in eliminating the inconvenience of the earlier one-man cars and made possible the development of the large one-man, double-truck car. A loud speaker for the announcement of approaching stops would add very materially to the convenience of passengers in this type of car and is worth attention.

Standardization of car entrances to eliminate confusion is well worth any expense. The resulting convenience to passengers and speeding up of the system has been amply demonstrated in Toronto, where the program of reorganizing to front entrance only has now been completed.

With front-entrance cars there is real need for the installation of some form of anti-slip aisle covering in the forward half of the car, and some improvement could be made in available commercial materials. At present we have installations of two types which take the place of the slats in parts of the car floor. Under diverse conditions these have given varying satisfaction.

A very great deal can be accomplished to add to the attractive and fresh appearance of cars by intensive attention to cleaning and washing and systematic painting. A clean and well-groomed car is a distinct selling asset and should be well within the economic capacity of the average railway. Without this feature it is impossible to attract the additional patronage so much desired. If every system was spurred to make supreme efforts in this direction the resultant gains soon would be apparent. An untidy appearance, eloquent of slovenly and haphazard care and attention, has the effect of alienating the public good will and support, without which no system can be successful.

With regard to painting, the psychological effect of the freshly painted car is undoubtedly that of a very persuasive and insistent salesman and, to the limit of its resources and income, there is no question that any railway will reap a very considerable patronage from the utmost effort that can be made in this direction. The spick and span, clean and newly painted car literally compels the patrons to sit up and take notice and is a constant perambulating advertisement of the fact that the management is doing its best to live up to the motto "It pays to please." There can be no excuse for cars being dirty, even though they may need paint and varnish. Soap and water are both cheap.

Rolling Stock Should Give the Best Impression Possible

By A. T. Clark

Superintendent of Rolling Stock and Shops United Railways & Electric Company, Baltimore, Md.

FIRST impressions are lasting impressions, according to an old adage. No wonder, then, that when a prospective street railway patron sees a dirty, poorly painted car approaching he concludes immediately that the railway company and all its endeavors are slipshod and in keeping with the appearance of this part of the equipment. No matter what later impressions of a better kind this patron may obtain, he still is of the opinion that the company, like the car, needs an overhauling. Not only has he acquired a poor idea of the system as a whole but he is ready to kick and complain of all the small incidents that may occur during his ride.

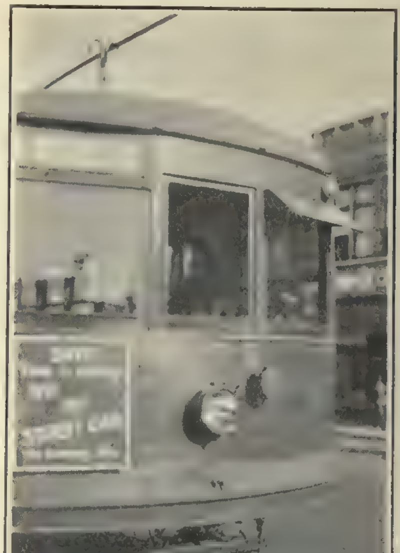
Now let us suppose that instead of a dirty, poorly painted car that came along while he was waiting the car had been well painted and was still in good condition, and in addition generally clean and attractive. In this case the patron would feel that the management behind the system was taking the best of care of what it had and was keeping its cars inviting in appearance. In most cases this car patron would not be so apt to be critical of any shortcoming; i.e., if the car was a minute behind he would be less likely to berate the conductor about this condition or to start an argument with some other complainer about how poorly this particular system may be operated. All because the first impression has put him in a pleasant frame of mind rather than the reverse.

Many companies believe that the cost of keeping cars in good paint condition and generally clean in appearance is very high. While it may require an unusual expenditure to work out a system of frequent and regular car painting and car cleaning, eventually this cost soon drops to a low amount well within the ability of any well-organized company to maintain indefinitely.

In addition to the better reaction of the riding public from well painted and thoroughly cleaned cars the management will obtain a direct benefit from the motormen and conductors, who naturally and unconsciously react on a higher and better plane of endeavor because of the higher morale resulting from the better appearance of the cars.

Sun Visor Protects Motorman from Glare

A SUN visor, similar to those used on automobiles, is the latest safety device which is being used on the Ogden-Main line of the Menominee & Marinette Light & Traction Company, in Marinette, Wis. This line runs principally east and west and the glare of the sun was found to be uncomfortable and irritating to the car operator. A local operator consequently suggested a shade which was designed and installed on the cars in the shops. The shade is made of sheet metal, is neat appearing and serviceable, and is proving very effective.

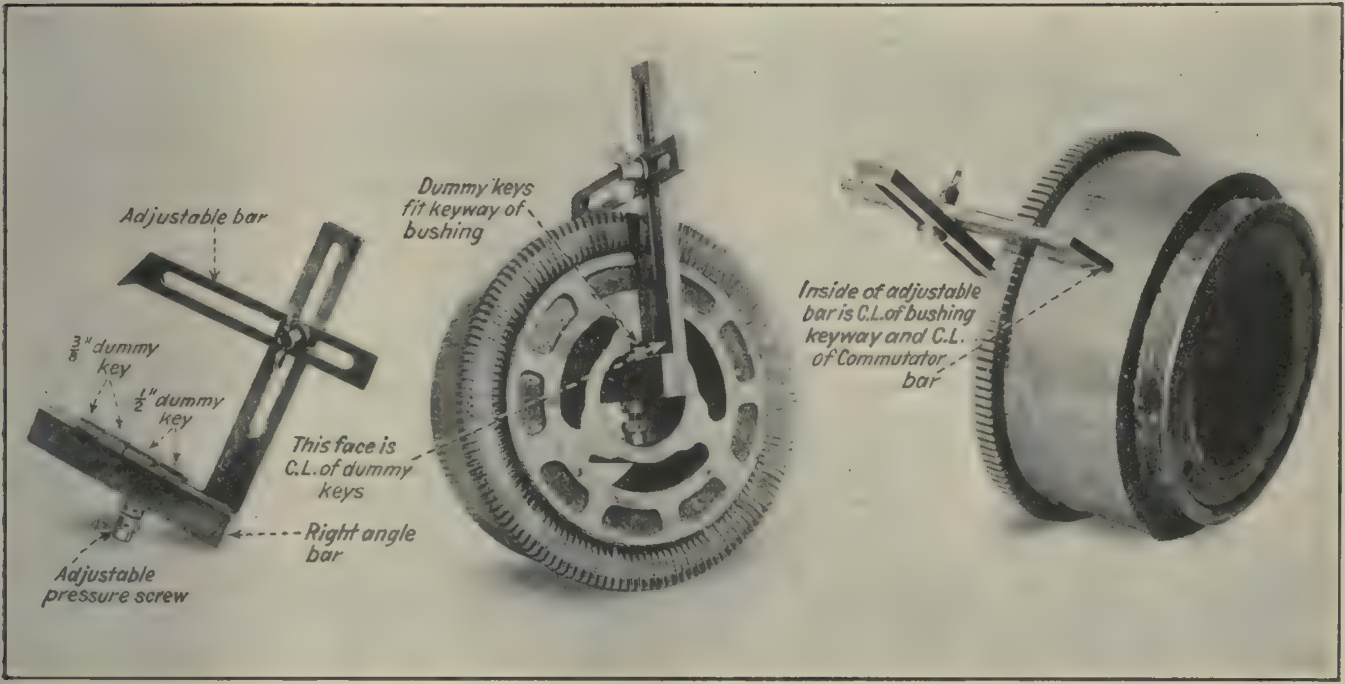


Car Equipped with Sun Visor Over Front Window Shields Operator from Glare

Methods and Equipment for Efficient Assembling of Commutators[*]

By Jesse M. Zimmerman
Renewal Parts Engineering, Westinghouse Electric & Manufacturing Company

Many Important Considerations Must Be Taken Into Account in Assembling the Individual Parts of V-Bound Commutators and in Pressing the Complete Commutators on the Spider—Methods of Tightening and Aligning Commutators Are Described, Together with Some Handy Tools that Will Facilitate the Shop Operations


Adjustable bar
3/8" dummy key
1/2" dummy key
This face is C.L. of dummy keys
Right angle bar
Adjustable pressure screw
Dummy keys fit keyway of bushing
Inside of adjustable bar is C.L. of bushing keyway and C.L. of Commutator bar

Methods of Aligning the Commutator Bars with Respect to the Commutator Spider Keyway

COMMUTATORS can be made tight fitting only if the parts are accurately machined and particular care is given to assembling. The order of the assembling operations is, first, to fit the steel V-ring over the spider. This may require some filing to remove paint and rust. Next, the commutator nut should be tried on the bushing. It may be necessary to clean out the threads of the bushing to allow the nut to screw up by hand. Then, when the detachable V-ring is under pressure, the commutator nut can readily be run up against the detachable V-ring, thus retaining the steel V-ring under the pressure given it.

The parts should then be dismantled and all dirt and paint must be scraped off, especially from the metal V's. The V's in the assembled segments can be cleaned with fine sandpaper, but should not be scraped with a knife, as it may deposit copper over the mica. After blowing out the dirt the commutator should be checked for short circuits with 600 volts between bars and after the V's have been cleaned and tested they should be brushed with a thin coat of shellac. The mica V-ring should be cleaned carefully with sandpaper, especially at the fit of the V's. After the surface which touches the copper has been thoroughly cleaned it should not be touched by the hand or any object whatsoever. This eliminates the possibility of dirt or moisture getting on the ring and causing a short circuit between bars after the commutator has been assembled.

The armature should be stood upright with the commutator spider uppermost while the rear mica V-ring is assembled. Then the assembled segments can be placed on the spider and the detachable front steel and mica V-rings assembled. The 3-deg. angles of the mica V-rings will bind against the 3-deg. angle of the copper V's before the banding wire is removed. The front mica V-ring must not be forced down, as to do so would injure the mica.

The commutator nut or bolts, if the commutator is a bolted type, should be located carefully as it is probable that the threads of the nut or bolts will not catch the threads on the bushing. Two pieces of cotton tape should be tied around the segments, one above the top banding wire and the other below the lower banding wire. Then a U-shaped clamping bar can be placed over the shaft so that it will bear on the detachable V-rings, as shown in an accompanying illustration. With the pressure clamp in position rectangular washers can be placed over the two bolts having long threads. The slack can then be taken up by tightening the clamping nut.

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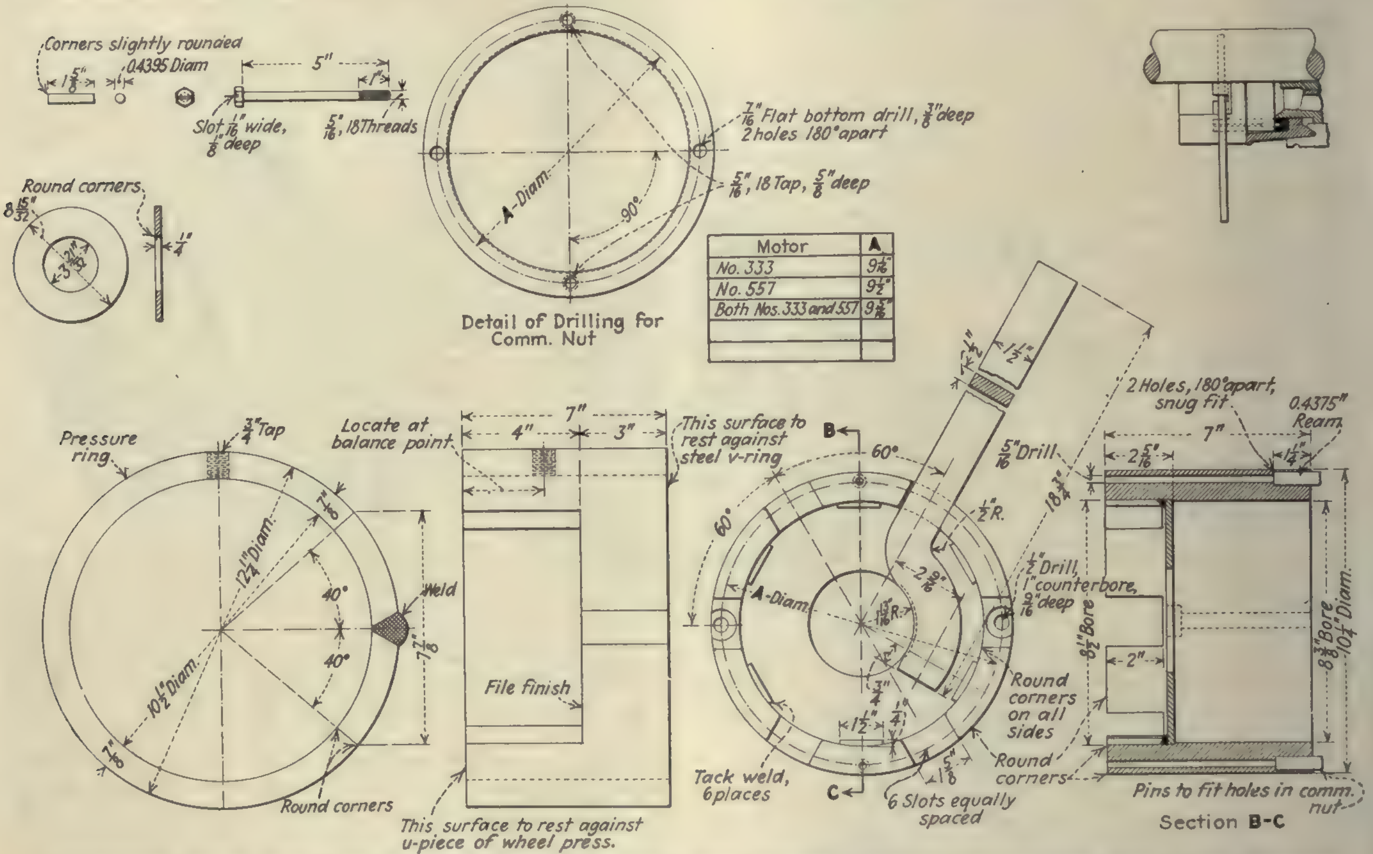
[*] This is the fifth of a series of articles on commutators for railway motors. The others were: Choosing Materials for Railway Motor Commutators, published Aug. 21, 1926; Important Considerations in Replacing Commutator Bars, published Oct. 23, 1926; Accurate Machining of the V's of Assembled Commutators Is Essential, published Nov. 20, 1926, and Mica V-Rings and Bushings Have Important Functions in Commutators, published Dec. 18, 1926.

The lower banding wire can now be cut and the slack should be taken up again by tightening the clamping nut. Next the upper banding wire can be cut and the slack again taken up. "Opened-up" places will appear between bars when the banding wire is cut. These "opened-up" places will disappear when the commutator is heated and subjected to pressure.

Proper alignment should be checked with a square. The bars should not be out of alignment more than the width of a mica strip.

The center line of the mica strip, or copper bar, as the case may be, should be lined up with the center line of the armature or slot tooth. Information for proper location will be furnished by the manufacturer of the motor. The metal V-ring should be tapped lightly with a rawhide hammer and the slack again taken up by tightening the clamping bolts. The commutator nut or bolts can now be tightened so that the assembly will be held firm when the clamping bar is removed. No attempt should be made to try to tighten the commutator assembly with the commutator nut while the assembly is cold. To do so will injure the mica V-rings. Also, the commutator assembly should not be tightened with the commutator nut without applying pressure to the steel detachable V-ring, as it may turn with the commutator nut during the tightening process, thus skewing the bars.



Commutator Wrench Which Can Be Used in Conjunction with a Ring Press for Assembling Commutators Either While They Are on the Armature Assembly or in a Vertical Press

At top, Pressure ring. At bottom left, Body. At right, Handle.

The armature should next be heated in a baking oven with maximum temperature not exceeding 150 deg. C. However, a baking oven with a temperature of 110 deg. C. will be satisfactory. A presure of 20 to 30 tons should be applied to the detachable steel V-ring to draw the commutator nut home while hot and under pressure.

After the assembly is cold, tests should be made for loose bars by tapping on the end of the bars with a hammer while holding the finger against the end of the bars. If any of the bars are loose they will vibrate. Finally, the commutator should be given a 600-volt bar to bar test and a 4,000-volt ground test.

Before describing the method of applying the necessary pressure to the detachable steel V-ring a commutator wrench will be explained which can be used with any of the methods for applying the necessary pressure.

A convenient type of commutator wrench is shown in an accompanying drawing. It consists of three major parts, the ratchet ring, the pressure ring and the wrench handle.

The outside diameter of the ratchet ring should be the same as the outside diameter of the commutator nut. Since the ratchet ring is to be bolted to the commutator nut, the inside diameter should be machined ¼ in. larger than the inside diameter of the commutator nut. This will eliminate any interference of the ratchet ring and the spider threads when the commutator nut has been drawn home. The length should be the distance from the commutator nut to the end of the detachable steel V-ring plus 5 in. This will leave sufficient room to operate the wrench handle when the commutator nut is tight.

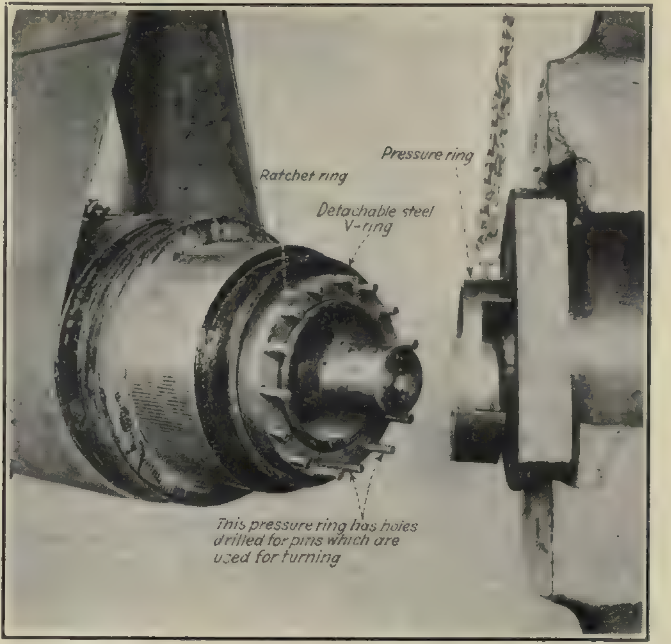
Six equally spaced slots should be cut approximately 2 in. deep and 1¾ in. wide. The slots can be milled or cut by first drilling a 1¾-in. hole and removing the remaining metal with a hack saw, milling saw or with an acetylene torch. The ratchet ring shown in the illustration for tightening a commutator in a hydraulic wheel press has fifteen pressure pins instead of the six slots. Either slots or pins will be satisfactory.

On the other end of the ring two holes for spanner pins are drilled 180 deg. apart and on the same bolt circle as the spanner holes in the commutator nut. A smaller hole should be drilled through the ring. This hole should be redrilled approximately 1¾ in. deep for the spanner pin. This will provide a stop for the spanner pins, thus keeping them from driving too far into the ring. By having the hole drilled through the ring the pins can be driven out should they break off.

Diametrically opposite from the spanner pin hole and on the same bolt circle two additional ½-in. holes should be drilled through the ring. The holes are for two bolts, which will be used to hold the ratchet ring to the commutator nut. It will be necessary to drill and tap two ⁵⁄₁₆-in. holes in the commutator nut besides the two spanner pin holes which are already drilled. This will eliminate the difficulty of holding the ratchet ring in place during the tightening operation.

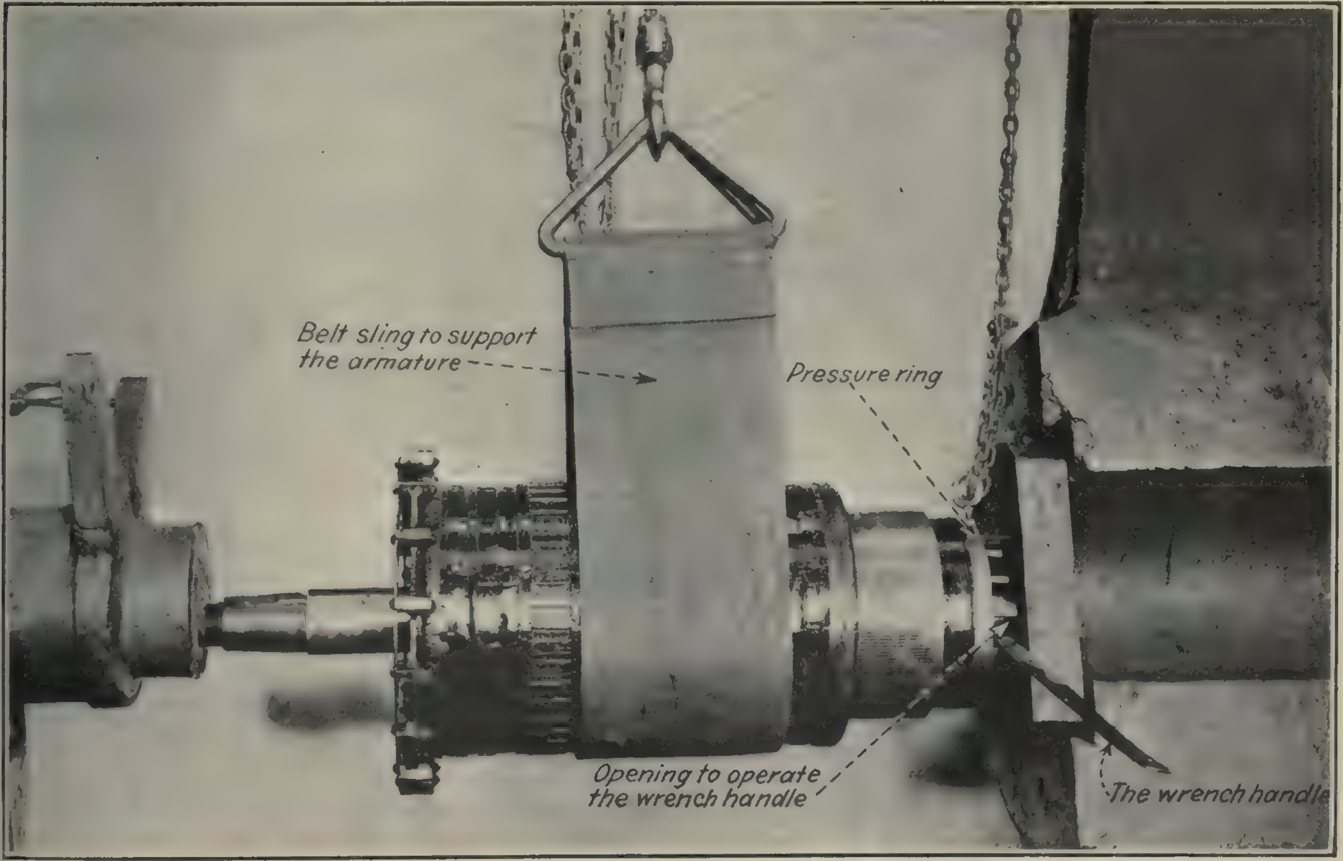
In order to relieve the strain on the two holding bolts described in the preceding paragraph it is well to bore the inside diameter of the ring in the front ¼ in. larger than the diameter at the rear. A circular guide plate should be placed in this offset and spot welded in place. The guide plate must have a hole bored in it large enough to fit over the shaft. It is best to wrap the shaft with a strip of thin sheet copper to keep the guide plate and the wrench handle from marring the polish on the journal.

The features outlined in the two preceding paragraphs are not necessary where a vertical press is used, because the weight of the ring will keep the spanner pins in the hole in the commutator nut. However, where the wrench is to be used in a horizontal press one will appreciate the necessity of bolting the ratchet ring to the commutator nut after trying to hold it in place during the tightening operation.

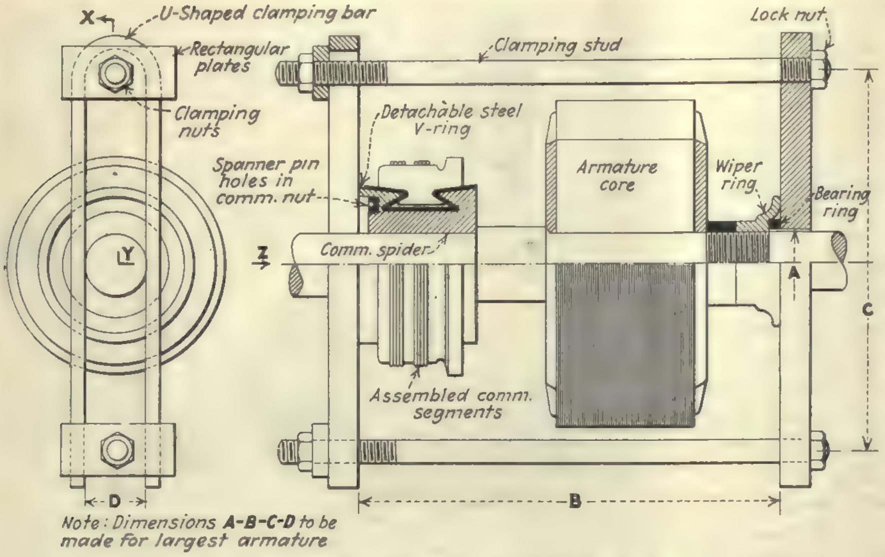

Pressure ring
Ratchet ring
Detachable steel V-ring
This pressure ring has holes drilled for pins which are used for turning

Parts Used in Tightening Operation in Wheel Press

Since the duty of the pressure ring consists in transmitting the pressure from the press to the detachable steel V-ring during the tightening operation it is essential that the face which comes in contact with the detachable V-ring should be solid in order to transmit


Belt sling to support the armature
Pressure ring
Opening to operate the wrench handle
The wrench handle

Tightening a Commutator in a Hydraulic Wheel Press with the Use of the Commutator Wrench



Press Which Can Be Used for Assembling Commutator When the Commutator Assembly Is on the Armature Shaft or Spider

the pressure evenly. It will be necessary to cut an opening in the other end for the operation of the wrench handle. If the slots in the ratchet ring span 60 deg., then the opening in the pressure ring should be at least 80 deg.

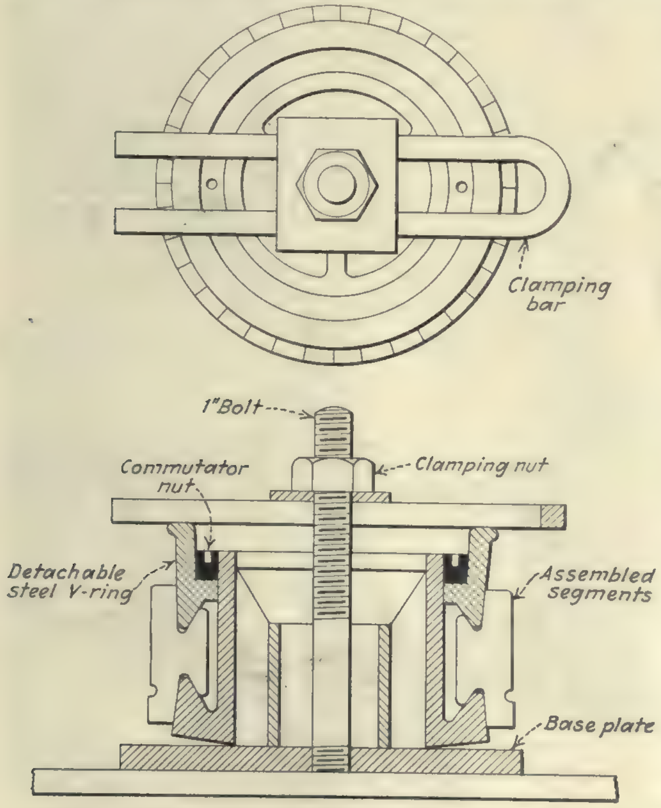
The outside diameter of the ring should not be smaller than the outside diameter of the steel V-ring. The inside diameter of the ring should be small enough so that the pressure face of the steel V-ring is covered. However, it should be at least $\frac{1}{4}$ in. larger than the ratchet ring. The thickness of the ring should be approximately $\frac{3}{4}$ in. or more.

The wrench handle should be curved at one end to fit over the shaft. The straight end of the handle can be used when the commutator is assembled before the commutator spider is pressed on the armature spider. A wrench similar to the one described above was made by Roy Clark, master mechanic, and Sam Augel, assistant master mechanic of the Saginaw, Mich., shop of the Michigan Railroad to be used in the assembly of Westinghouse 557 and 333-V commutators. These commutators being similar, it was possible to adjust the dimensions so that one wrench could be used on both commutators. This wrench was made as follows:

The ratchet ring was made from the hub of an old gear, the spokes being cut off with an acetylene torch. The hub was then placed in a lathe where the outside diameter was turned to $10\frac{1}{4}$ in., and the inside diameter bored $8\frac{3}{8}$ in. The ends of the ring were faced so that the finished ring was 7 in. long. The slots were made by first drilling $1\frac{3}{4}$ in. holes and then cutting the rest of the metal out with the acetylene torch. The bolt circle, *A* for the spanner pins and the holding bolts was made $9\frac{5}{16}$ in. The drilled holes for the spanner pins and the tapped holes for the holding bolts in the commutator nut were drilled and tapped on a $9\frac{5}{16}$-in. bolt circle. The guide plate was located by boring the front inside diameter $8\frac{1}{2}$ in. and $2\frac{5}{16}$ in. back. The diameter of the guide plate was machined $8\frac{15}{32}$ in. in diameter. It was held in place by six spot welds.

The pressure ring was forged out of a hot rolled steel plate $\frac{7}{8}$ in. x 8 in. x 36 in. It was forged around an old pinion whose outside diameter was $10\frac{1}{2}$ in. The ring being large, it was not necessary to weld it. The opening for the spanner wrench was made with the acetylene torch. The forged ring when cold was slightly smaller than $10\frac{1}{2}$ in. Therefore, it was placed in the lathe and the inside bore machined to $10\frac{1}{2}$ in. The two pressure faces were machined, thus making the finished length approximately 7 in. With this wrench and a wheel press Mr. Clark feels that he has made the tightening operation of his commutators a simple and sure operation.

It is bad practice to tighten the commutator nut with a special drift and a heavy hammer without applying a pressure to the steel V-ring. This batters up the commutator nut and steel V-ring and tends to turn the steel V-ring, which in turn skews the bars. The commutator nut should not be tightened until after the steel V-ring has been subjected to a pressure and the assembly heated. This method of heating the commutator and applying the pressure will be discribed for two conditions: First, where the commutator spider has not been pressed on the armature spider, and, second, where the commutator spider has been pressed on the armature spider.



A Simple Assembling Plate Which Will Facilitate the Assembling of Commutators When They Are Not Part of the Assembly

TIGHTENING A COMMUTATOR WHERE ITS SPIDER HAS NOT BEEN PRESSED ON ARMATURE SPIDER

The most efficient method of heating the commutator under the above conditions is in an oven which will heat a commutator from 125 deg. to 150 deg. C. A simple heating stand for commutators can be made as shown in an accompanying sketch. The hole in the stand should not be larger than the opening in the commutator spider. This opening allows the flame of a gas torch to pass through the commutator spider. An asbestos board, with a hole for the gas to escape, should be placed over the top of the detachable steel V-ring. It is not advisable to use a sheet steel plate, as the heat will cause it to warp and allow the flames to pass between the plate and the detachable V-ring, thus consuming the bond in the mica V-rings.

The temperature should be measured with a thermometer, it being placed on the copper bars next to the V-ring, with the bulb covered with putty. This will give a true indication of the temperature of the copper. The thermometer should register from 125 deg. to 150 deg. C.

Skewing of commutator bars can be prevented by placing the commutator on a clamping plate, as shown. It consists of a steel base plate, a bolt and a clamping bar. After the bars have been properly aligned the commutator is placed on this plate and the clamping bar is drawn down. The clamping bar serves as a press and prevents the detachable steel V-ring from turning. Several blows on the steel V-ring with a rawhide mallet will cause the V-ring to take its place. After the clamping bar has been drawn tight the commutator nut can be tightened.

For small commutators the clamping bar as just described will furnish sufficient pressure to obtain a tight commutator. However, on large commutators it will be necessary to use a press and a special wrench as described in the first part of this article.

VERTICAL PRESS METHOD OF TIGHTENING COMMUTATORS

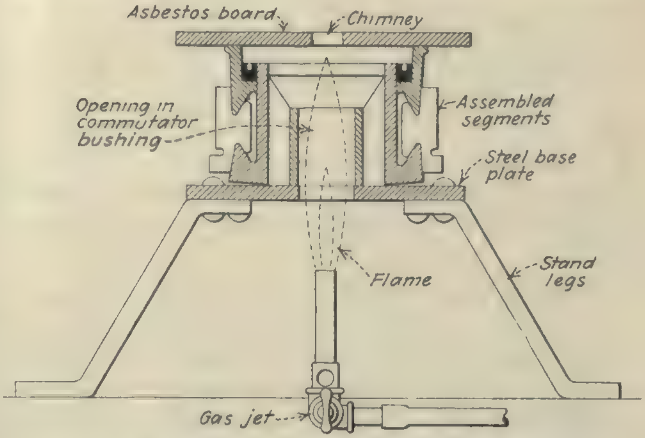
After the commutator has been heated and the bars aligned properly the commutator is ready to be placed on the vertical press with the front of the commutator up. The ratchet ring should be placed so it will engage the two spanner pins in the holes in the nut and the ring should be bolted to the nut with two bolts. The pressure ring can then be slid over the ratchet ring so that the solid side of the ring will be against the steel V-ring. The pressure ring should be subjected to a pressure of 20 to 30 tons, depending upon the size of the commutators. The wrench handle placed through the opening in the pressure ring into the slots in the ratchet ring will draw the commutator nut home.

It is possible to use the press without this commutator wrench by applying the pressure to the steel V-ring and by tightening the nut with a drift. However, this is more difficult and the results will not be as good.

TIGHTENING A COMMUTATOR AFTER ITS SPIDER HAS BEEN PRESSED ON THE ARMATURE SPIDER

Before undertaking to assemble a commutator it should be heated to 125 deg. to 150 deg. C., regardless of the method used. The heating operation is necessary to soften the bond in the mica V-ring and the commutator strip. Subjecting mica to a pressure while it is cold pulverizes the bond. On the other hand, if the mica is heated the bond will soften and allow the mica to conform itself to the metal parts when a pressure is applied. For this reason only is it necessary to heat the commutator.

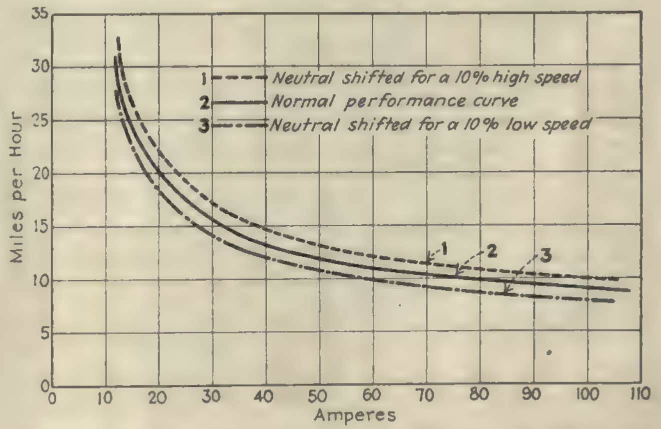
In heating a commutator it is best not to allow the flame to touch the copper. However, where no oven is available, to a certain extent the flame will have to be played on the copper. Before starting to heat the commutator, the mica V-ring should be covered with asbestos cloth so that the flame will not burn the bond in the mica V-ring. It is well to do most of the heating on the commutator spider and steel parts of the armature core as they will retain the heat longer, thus keeping the mica V-ring hot during the tightening operation.



Method of Heating a Commutator When the Commutator Is Not Assembled on the Commutator Spider

The ideal method of tightening a commutator under this condition is with the wheel press after the commutator has been heated. In this operation the armature should be supported in a sling and the ratchet ring should be bolted to the commutator nut. The pressure ring can then be slid over the ratchet ring, after which the slack on the press should be taken up and the pressure ring adjusted. By applying the necessary pressure the commutator nut can be drawn home with the curved end of the handle against the shaft.

For various reasons some companies will not feel like spending the money for a commutator wrench or a press for tightening their commutators. For commutators used on 30-hp. motors or less than 30 hp. a very efficient press can be made to do the work at a very low cost. Such a press is shown in an accompanying line drawing and was made by placing an old car wheel or some sort of a base plate on a level foundation. Two 2-in. holes were drilled in the web of the wheel near the flange and two upright posts were fastened with two nuts, one on each side of the wheel. These posts were made of 2-in. bolts about 30 in. long and were threaded at both ends, the thread at the top being 12 in. long. The armature shaft is placed in the hole in the hub and the necessary collars are inserted so that the



Performance Graphs of a Westinghouse No. 508-A Railway Motor Showing Effect of Shifting Commutator

armature will be supported from the wiper ring face and not by the extreme end of the flange of the wiper. A U-shaped bar is placed over the shaft so that it will rest on the interchangeable steel V-ring and the necessary pressure is applied by screwing the bolts down so as to turn the commutator nut home.

This press can be modified to suit existing conditions. However, its use should be limited to small commutators.

ALIGNMENT OF COMMUTATOR BARS IS IMPORTANT

Correct alignment of commutator bars with respect to the center line of the starting coil, when rewinding the armature, will insure correct location of the neutral commutating zone. If the commutator bars are not correctly aligned with the center line of the armature coil the neutral commutating zone will be shifted. This will produce the same results as shifting the brushes the same distance in the opposite direction.

Shifting the commutating zone will cause the motor to have a higher or lower speed, depending upon the direction of rotation. Let us assume a possible case. A car is equipped with two motors, both having the commutator bars shifted the same distance but in the opposite direction from the neutral zone, the one motor having a 10 per cent high speed and the other a 10 per cent low speed. If the car runs continuously in one direction, below 10 m.p.h., the motor with the high speed will carry approximately 50 per cent more of the total load. When the car is operating at a higher speed this difference in load will decrease as the speed increases. This is illustrated in the motor curve, reproduced. There is a 50-50 chance that the motor having the higher speed may also have the larger wheel diameter, assuming that one set of wheels may be worn more than the other. The above illustration shows the importance of having the motors run at as near the same speed as possible, thus eliminating undue overheating.

The conditions may not be as bad as pictured above, but they will vary in proportion to the distance that the commutator bars are out of alignment. Motors having wider bars will produce a greater variation in speeds and commutating difficulties. The commutating pole motor is more sensitive. Therefore, the alignment must be more accurate.

Shifting of the commutating zone will agitate sparking. Sparking will cause flashing, when the motor is operating at a high speed, as well as numerous other commutation troubles.

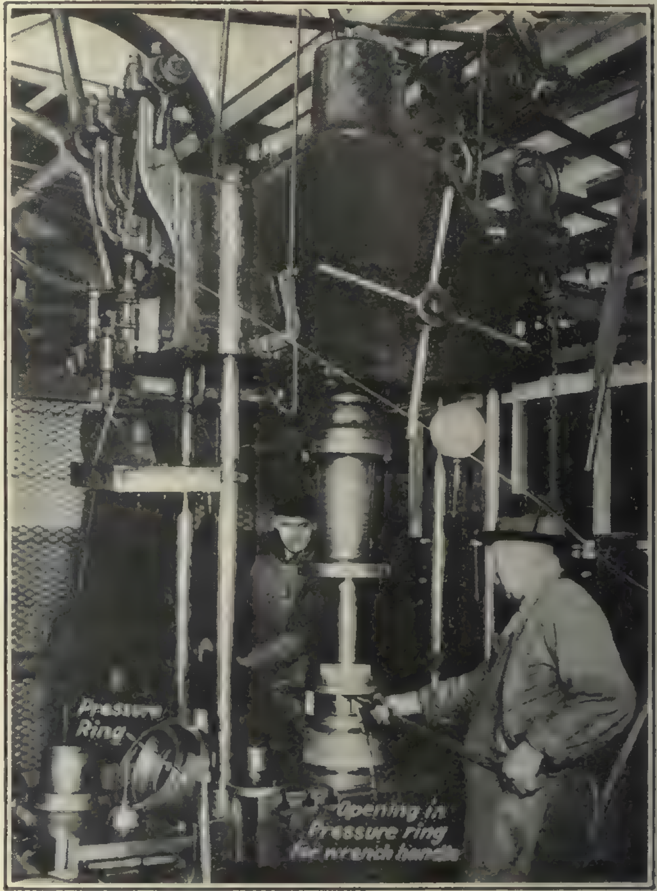
TOOL FOR ALIGNING COMMUTATOR BAR WITH ARMATURE SLOT

A simple aligning tool can be made from a straight edge bar about 1 in. wide with two stationary pins and one movable, so spaced along the center line of the bar that the two stationary pins will rest on the center line of the armature tooth while the movable pin will be above the commutator. This tool is inexpensive and easy to make. It can be used on all types of armatures.

The center line of the keyway in the commutator bushing is usually the center line of a slot in the armature core. This definite relation is maintained by the relation between the common center line of the keyways in the armature spider, the commutator bushing and the armature punchings.

One aligning tool can be made to fit all the commutator spider keyways by using different sizes of dummy keys, as shown in accompanying illustrations. The right angle bar is made so that the inside of its vertical bar is the center line of the dummy key, which would make it the center line of the keyway in the commutator bush. This makes the inside of the adjustable bar the center line of the dummy key.

The dummy key fits the keyway in the bushing. The gage is held in place by the adjustable pressure screw. This particular commutator calls for the center line of the keyway to line up with the center line of a commutator bar. If the center line of the bar coincides with the inside of the adjustable bar, then the center line of the commutator bar will be in alignment with the center line of the armature slot when the bushing is pressed on the armature spider. If a commutator calls for the center line of the mica to align with the center line of the keyway, the inside of the adjustable gage must coincide with the center line of the mica.



Assembling a Commutator in a Vertical Hydraulic Press

In the final test the following important dimensions should be checked. These dimensions should be recorded before the old commutator segments are moved:

1. The distance from the rear of the bar to the rear end of the bushing. This determines the correct location of the commutator.

2. The width of the neck. This will determine whether the clearance between the brush-holder and the neck will be correct.

3. The length of face to make sure the brush surface is the proper width.

4. The outside diameter of the face to give the correct clearance between the brush-holder and the commutator.

We Are Acquiring a New Viewpoint*

Manufacturer and Operator Have a Common Interest in the Future of the Transportation Business—Former Methods and Precedents Are Subject to Question—There Is Growing Evidence that Improvement of Facilities Is a Paying Process

By Willits H. Sawyer
President American Electric Railway Association
and President East St. Louis & Suburban Railway

Willits H. Sawyer

WE ARE beginning to get proof of the soundness of the policies adopted by those electric railway properties which have had sufficient confidence in the local transportation business to go ahead in the expenditure of money and effort for the improvement of their facilities and the development of an aggressive merchandising program. Today we are not going to conventions for the purpose of commiserating with each other and talking about our troubles. We are beginning to look forward with courage and enthusiasm, instead of backward with self-pity and doubt. We are now asking ourselves what we should be doing instead of reciting our troubles and begging some one else to do something. We are looking to the future. And as we look, we see more clearly every day the incontrovertible fact that the public must have public transportation service, and that even the coming of the private automobile has not changed that fundamental requirement.

TRANSPORTATION IS A NECESSITY

We can nail down hard this one basic fact, "The public must have transportation." We, as transportation men, are the logical people to furnish it. Our job is to supply a character of service which will adequately meet present-day conditions. Once we do that our difficulties will diminish rapidly. It is to the growing appreciation of these facts that the present-day difference in the character of conventions such as this is attributable. We are now going to conventions to get new ideas for self-improvement. We are trying to learn how to do a better job than we have been doing. And the man who misses that point in a convention is missing the very reason for his attendance.

During this meeting of the Midwest Association we have been talking about the advantages of new cars. We have been considering the reasons for new cars. There has been presented here the experiences of some of the properties that have tried them and figures showing the price the industry is paying as the result of the operation of obsolete equipment. It has been a most convincing story. The effect of modern cars on operating costs and revenues has been demonstrated. But that is only part of the story which has been told. In the past cars have been considered as an engineering matter. Today they are being considered from the sales viewpoint. We have given much consideration to their design, from the standpoint of engineering and economics, but the most important thing we have been discussing is the use of new and modern cars as a means of selling interest, enthusiasm and pride in our service, to our employees and public. That is a phase of the car situation which we have entirely overlooked in the past.

We have talked much of the need for co-ordination, but we are beginning to see more clearly a condition which calls for greater co-ordination within our own industry. I have always been a stanch advocate of the value of the service rendered the electric railway industry by the manufacturers and of the part they have played in its upbuilding. But today there is another group of manufacturers playing an active part. They represent the automotive point of view and automotive methods. They are setting a pace in merchandising effort with which the electric railway manufacturer is failing to keep pace. We are faced with new conditions. Our entire viewpoint is undergoing a rapid and deep-seated change. We operators are revising our conception of the transportation business and of our responsibilities to our properties and our public. We are trying out new tools, and we still have much to learn about how to co-ordinate them with those to which we have been accustomed. We have made many mistakes, and we shall continue to make them until we learn how to adapt ourselves and our methods to conditions that exist today.

In all of this the electric railway manufacturer has a primary interest and a primary responsibility. He furnishes the tools with which we work. Our success spells his success, our failure means failure for him. Operator and manufacturer are in the same boat. We float or sink together. If he permits new tools to be used where the old ones, properly improved, are better adapted; if he fails to keep his products up to the need of the times; if he hesitates to express frankly his views, or to invest money in the development of his product, he fails to meet his responsibility to the industry of which he is a part, and to his own stockholders. In the struggle to co-ordinate various vehicles into modern transportation systems the electric railway manufacturer must meet the development and merchandising aggression of his competitors. Only in that way will the car and bus finally be fitted together on a sound, economic basis. The electric railway manufacturer must tell his story frankly, even bluntly, if he expects to move ahead under modern conditions.

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*Abstract of address at the meeting of the Midwest Electric Railway Association, Tulsa, Okla., Jan. 6-7, 1927.

Something was said here today about the tendency to use our hearts instead of our heads in the consideration of buses and cars. We can't afford to do that. We must act on the basis of strict business considerations. Every precedent of the industry is subject to question in the light of changed conditions. The fact that we have always done a thing in a given way is good reason for questioning the wisdom of that practice.

Getting back to the bus, there is no question but that it is here to stay, and has a permanent place in the scheme of transportation. But in many instances it was introduced on the wrong basis. High-pressure selling was not always accompanied by wise merchandising. The bus manufacturer himself has not always properly analyzed the situation. Enthusiasm was and is being accompanied by much loose talk as to what the bus can and cannot do. There is danger that this may react against the proper development of the bus as a transportation agency on a basis which will permit it to be operated at a profit. The manufacturer who, in his eagerness for immediate sales, fails to consider the limitations as well as the advantages of the bus is storing up future trouble for himself and for every bus operator. We have talked much of co-ordination, but have made little progress in interpreting it into operating practice. There are buses in service today where they should not be operating. Many others have been installed under conditions which are subject to serious question as to character of service rendered and rate of fare charged. On the other hand, there are possibilities for bus operation that have hardly been tried. Co-ordination does not mean just putting some buses in service. Nor can a successful bus manufacturing organization be built by just selling buses wherever and whenever they can be forced into service.

WE ARE ACQUIRING A NEW VIEWPOINT

There is need for greater co-operation between manufacturers and operators in the development of the transportation business. There is increasing evidence that the electric car is economically the backbone of a properly co-ordinated transportation system. It should continue to handle the bulk transportation needs of our cities. Use of buses as street cars on rubber tires, for feeder and extension service is merely a stop-loss application suitable for thinly settled territory which will not support a rail investment. But there is a broader field for the operation of buses, particularly in the larger cities. The margin between street car fares and automobile operating costs and between street car service and automobile service is so wide that the bus offers an opportunity to develop entirely new business for a public transportation system by rendering a service which approaches more nearly than does the electric car that of the private vehicle. It is in that direction that the opportunity seems to lie for making bus operation really profitable. It is in that direction that the effort of the bus manufacturers should be directed, if their business is to be put on a sound basis. Only by making bus operation profitable can it be established on a sound foundation.

We, as transportation men, have a duty to the communities we serve. We are beginning to acquire an entirely new viewpoint in the discharge of that obligation. In the past we have thought merely as the producers of transportation. We have been primarily engineers. We have selected and operated our cars from an engineering viewpoint. Merchandising and salesmanship are not new words to us, but today they have a new significance as applied to our business. We are actually beginning to think more as merchants and less as engineers. Our big job is to develop and sell a product which will attract patrons. But the industry is far from doing the job which it should be doing, and which it will have to do before real success can be won. In the past our methods have been wrong. If that had not been the case we would not have had a hard luck story to tell. Our success in the future will be achieved by conducting our business differently than in the past. The process of improvement consists of the application of those methods and ideas which other companies have already found beneficial. We can't stand still. If we attempt it we shall continue to slide down, and finally out. When we go to conventions it should be to seek new ideas and suggestions, not to exchange our troubles. When we learn of ideas which have helped others, we must go back to our properties and find ways and means of applying them. Properties which have adopted a policy of progressive improvement of their service have made that improvement pay. The money spent for new cars and new facilities has been a profitable investment in every instance where it has been intelligently applied. In the experiences of those who have gone ahead in the last few years there is a real inspiration for the industry which points the way toward general improvement and financial success.

Curbstone Parking Can Serve Only a Few at Best

PARKING facilities on downtown streets are woefully inadequate at best, according to Dr. Miller McClintock, director of the Albert Russel Erskine bureau of Harvard University. A recent survey of seventeen American cities in which 1,424,660 automobiles entered the business district daily had curb space available for parking only sufficient to accommodate 147,081 cars.

In Chicago alone the Metropolitan Street Traffic Survey reveals the fact that the famous Loop in that city when used to its fullest capacity and with 100 per cent turnover every 30 minutes provided parking facilities for only 15 per cent of the 122,000 automobiles that daily enter this district. Storage garages and off-street facilities provide room for only 8,000 additional cars.

'There is no city in the country," declares Dr. McClintock, "that possesses curb space in the central district capable of accommodating the parked cars of more than a small fraction of the motorists who enter the district daily."

Dr. McClintock believes that the motor car is of sufficient importance as a means of transportation to warrant the provision of housing facilities at reasonable costs near the office or downtown destination of the driver and states in this connection that: "There is no more important improvement that can be undertaken to encourage the use of the automobile as a standard and daily means of personal transportation than for cities to encourage, either by public construction or by private means, the construction of storage space for automobiles near the center of the business district. There should be accommodation for every motor car that is brought into the city in some safe, off-street storage space."

Development of Commercial Sense Needed*

Modernization of Town and City Transportation Demands More than New Physical Equipment — A Large Amount of Business Can Be Developed, but It Requires the Right Attitude—Formation of Commercial Department Urged

By R. N. Graham
Manager of Railway the Pennsylvania-Ohio Electric Company, Youngstown, Ohio

BEFORE the automobile existed there were communities too small to support a public transportation service. Communities where the entire area was easily within walking distance never presented a field for such enterprise. However, in those days, when a community expanded to such an extent that traversing the average distance between the residence portion and the business portion took too great a period of time or effort on the part of the individual, there immediately became a field for public transportation.

While the horse and buggy furnished a perfectly good conveyance, there was too much trouble and expense attached to its care to warrant the individual freely making use of it in preference to public transportation. With the great use of the automobile the field of public transportation in communities has narrowed. The community must be larger than under the former conditions. Even where a community is large enough to support a system of public transport, there is a large possible market which swings between the use of private automobiles and the vehicles of a public service.

Consider the typical urban community. A certain number of the people who live in it and whose livelihood is earned in the business center will walk from their homes to their work and vice versa. They are not customers of the public utility. A certain number live too far from the business center to walk and do not own automobiles; they will be customers of the public utility. A certain number live too far from the business center to walk but have their own automobiles; they may or may not be regular customers of the utility. Whether they are customers of the utility or not depends on several factors: (1) The service given by the utility; (2) the public attitude toward the utility; (3) the custom of the community; (4) the degree to which economic considerations are factors in determining choice of means of carriage.

I will not attempt to analyze all these factors but will content myself with a few general observations. The American people today do not examine closely comparative costs when these are small. If the private automobile is more convenient and comfortable than the public transportation system, the greater cost of the private automobile will not be a serious factor against it. On the other hand, the public is influenced by such factors as comfort, convenience, custom, prestige and even social consideration. If the public transportation offered is efficient and convenient, if it is considered snappy, modern and up to date, if the use of this public transportation does not constitute a social inferiority nor force the prospective passenger to mingle with undesirable companions, there is no reason why he should not avail himself of such service.

Therefore, in any community capable under any circumstances of supporting a public transport system, there is a large business which either may come to the utility or be withheld from it. For the purpose of this discussion, it is not even necessary for us to agree upon the factors involved. If there is such a business, it is manifestly the job of the utility to secure the maximum amount of it. Granted this, we must immediately concede that it is not sufficient for the utility to lay its tracks and operate its street cars and buses through the streets of the community and maintain its vehicles and facilities in an efficient and workmanlike manner. The transportation utility is engaged in a business in which a large proportion of the traffic that it will enjoy depends on the discovery and handling of factors which, to a large extent, may be individual and personal to the community it serves. It is engaged in a commercial venture whose prosperity depends on factors merchandising in their nature. Therefore, the first step in

> **WE OPERATE buses in every city in which we furnish transportation. . . . As a result of our experience we do not consider the bus in any sense a successor to the street car and yet we consider it a useful part of our transportation system and a modern development of help to our operation. . . .**
>
> **We have discovered that the so-called rubber urge is simply a figure of speech. There is no apparent difference in the attitude toward our facilities in the portion of the communities we serve with street car lines and the portion we serve with bus lines. . . .**
>
> **On account of the low seating capacity of the bus with its comparatively high operating cost, the average length of haul which can be given profitably with a standard city fare is lower than with the street car, so that the street car must remain the backbone of urban transportation.—R. N. GRAHAM.**

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*Abstract of a paper read at the meeting of the Midwest Electric Railway Association, Tulsa, Okla., Jan. 6-7, 1927.

modernization of town and city transportation with respect to the condition that existed before the present use of the automobile is the development of the commercial sense of the transportation organization.

On every transportation property, regardless of size, we will find a department head charged with the responsibility for the maintenance of equipment, another charged with the responsibility for the upkeep of track and permanent structures, another whose duty it is to see that the cars are operated according to schedule and in a proper and workmanlike manner. These duties and responsibilities have become so fixed through a long period that we expect to find such division of responsibility on every property. Taking the business as a whole these functions are carried on in an efficient, capable and modern manner.

> **THE general subject of advertising and publicity is concerned to a large extent with the general attitude of the public of a given community toward the transportation utility. The utility is there living with them; even though they are not its customers they see it and come in contact with it. They may view it as a decrepit, outworn institution, as something obsolete and passing, or as a live, vivid portion of the community's life. To secure this latter reaction is in general, I think, the real purpose of publicity.**
>
> —R. N. GRAHAM.

However, the present need of the business is for an additional operating department, which can be termed the commercial department. It will be the function of this department to secure that business which may be given the utility or withheld from it. Naturally there will fall to this department the following chief responsibilities:

1. Development of the platform personnel of the organization to be not only efficient motormen, conductors or operators, but business getters.

2. Checking of the traffic that is carried and the traffic that can be carried, in order to adjust schedules to obtain the maximum amount of profitable business.

3. Preparation of schedules that can take care of the maximum amount of profitable business and that will best serve the traveling public.

4. Proper publication, announcement and posting of the scheduled facilities of the company to render it as easy as possible for the public to avail itself of the facilities offered.

5. Advertising of the facilities of the company through such mediums and in such manner as will best divert to the company the business that can be diverted.

6. Handling of all points of contact with the public in such manner as will make the relationship between the utility and the public as pleasant as possible, so that actual business shall not suffer through unfriendliness, prejudices or dislikes.

7. Development of such improvements in organization, equipment or practices as will be economically sound and at the same time either result in improved business to the utility or prevent loss of business already enjoyed.

This commercial department is at least of equal importance with the maintenance of way, equipment or transportation operation. In my opinion, it is of greater importance than any of the three mentioned and its head must be of at least equal caliber to those who act as heads of the departments conveniently considered necessary.

From this it will be evident that I consider that modernization of transportation does not consist of concrete acts such as purchasing new cars, putting up billboards, adopting a new uniform, or perhaps replacing a car line with a bus line. True modernization consists in changing the conception of the purpose of the particular utility to take care of certain business that must be carried to that of an aggressive sales organization which not only operates in an efficient mechanical way, but whose organization and manner of thought are directed to acquiring all the business possible.

With such a purpose and such an organization it will follow naturally that the concrete acts that have been or that may be suggested will be properly considered and weighed, will be adopted when such adoption seems feasible, but when adopted will not be unrelated desperate experiments or expedients, but will be followed up and continued as a definite and ordered business program.

The commercial department of such a transportation organization, if functioning properly, will develop along the lines most proper to the field where it is working. There are a few general observations that I would like to offer along the line of modernizing transport:

On our Pennsylvania-Ohio system we have made rather sweeping changes in our physical plant in the past several years. We have embarked on a comprehensive bus system, overhauled a number of our operating practices and practically replaced all our street cars with more modern ones. However, among the numerous letters of commendation we have received there have been very few that have referred to these matters. These letters of commendation from the public almost invariably concern themselves with unusual acts of courtesy or thoughtfulness on the part of our working force. This illustrates the importance of the item of personnel. A street car may be very attractive in appearance, be kept clean and otherwise satisfy the passenger, but if the operator is surly or dirty, the impression left upon the passenger will be unpleasant. It is, therefore, as necessary to check the work of the operator from the standpoint of courtesy, cheerfulness and neatness as it is from the standpoint of safety and efficiency.

The commercial department should be able to classify the operators from the standpoint of their ability as business getters. Those operators who are disagreeable to passengers should not be permitted to remain in the business, regardless of their mechanical efficiency. An efficient and capable operator who does not possess the right mental attitude toward his job from the standpoint of attracting business should not be discarded without every effort having been made to enlist his interest and co-operation in this respect. I have found the booklet "Salesmanship" by George Baker Anderson, manager of transportation of the Los Angeles Railway, the best printed document on this idea as applied to motormen, conductors and operators. A booklet of this kind, couched in simple words, brief and suitable with respect to the local conditions of the property, should be in the hands of every platform employee.

The outstanding convenience of the private automobile in the control of a man to use in taking him from his residence to his work and back is that it avoids the necessity of standing on the corner waiting for a more or less indefinite period. This objection to the street car or bus facilities is, of course, eliminated when the headway is very close. In the small city or town the headway must be governed by good business economy. The public convenience of a close headway can be obtained where headways are long by informing the customers fully of the time they may expect the car to arrive at their corners. This, in turn, requires very careful scheduling and thorough advertising of such schedules. It also requires the use of intermediate time points and adherence to them. This further means that on any property, large or small, there must be a complete running check at all times of schedule at such time points.

On our system, our practice in this regard is so completely developed that on our suburban transportation lines the leaving time at each intermediate stop is shown on painted boards at these stops. We have changed headways on lines from one hour to two without diminishing our business.

> **MODERNIZATION of transportation does not consist of concrete acts such as purchasing new cars, putting up billboards, adopting a new uniform, or perhaps replacing a car line with a bus line. True modernization consists in changing the conception of the purpose of the particular utility to take care of certain business that must be carried to that of an aggressive sales organization which not only operates in an efficient mechanical way, but whose organization and manner of thought are directed to acquiring all the business possible.**
>
> —R. N. GRAHAM.

Changes of routes and schedules afford a chance for unpleasant misunderstandings. For more than a year we have issued monthly a printed schedule book which is distributed at our stations, at hotels, clubs and other public places. A copy of this schedule is mailed regularly to any one requesting it on his letterhead. The mailing list for the schedule at the present time is about two thousand. In the schedule attention is called to the manner in which to secure such regular mailing.

Except in the largest cities, it is entirely practicable to have displayed in the car itself the schedules and time points of the line so that the people using the line can familiarize themselves with the scheduled leaving time of the cars from each time point. If the schedules are not closely followed, such information naturally will call attention to bad service. It consequently follows that the commercial department not only must have a complete check of actual operation of schedules, but must ascertain and report the reason for inability to fill properly devised schedules.

The general subject of advertising and publicity is concerned to a large extent with the general attitude of the public of a given community toward the transportation utility. The utility is there living with them; even though they are not its customers they see it and come in contact with it. They may view it as a decrepit, outworn institution, as something obsolete and passing, or as a live, vivid portion of the community's life. To secure this latter reaction is in general, I think, the real purpose of publicity.

Snappy, modern uniforms of whipcord; badges that are shapely and attractive; a coat of arms or other trade mark indicating that the utility wishes to establish a personality; cars which, while they may not be new, are at least kept bright and attractive with frequent lacquering; windows that are kept clean and polished; all these furnish a basis of the service to which attention can be called in many ways.

We have organized from our force an orchestra and quartet which, through constant practice, have become fairly proficient. A cheap scenic representation of a street car furnishes the background for this musical organization, which has appeared and is appearing before the luncheon clubs, improvement clubs and other civic organizations of our various communities.

On our suburban lines we have marked stations with electric signs, have placed on the highways zone markers in the shape of our coat of arms, and have freely used illuminated billboards. We do not anticipate that because some one reads of our service on a billboard or in the newspaper he will immediately put up his automobile to avail himself of our service, but we want every one in our communities to know that at any time they desire, they have a modern utility, aggressive and growing and eagerly desiring to be of service to them.

There has been much discussion in the industry of the advantage of securing new and more comfortable equipment. From our own experience, I am unable to express an opinion as to whether in any case the financial returns would warrant the replacement of good, usable equipment with more attractive equipment, with the question of attractiveness the only purchase consideration. While practically all the rolling stock on our property has been newly purchased within the past seven years, in no case was the request for such purchase made merely on the basis of securing attractiveness. Our property was being changed to one-man operation and the controlling factor in the decision to purchase new cars was the ability to operate them with one man and to secure light weight. The economies to be gained dictated the policy of purchasing equipment.

However, in the case of our last city cars and interurban cars, the question arose of whether it would be advisable to purchase the light-weight, one-man equipment constructed as cheaply as possible, or, with additional outlay, to give greater comfort to our customers and provide better looking vehicles. The difference in price between the plainest cars we could buy and cars in which many elements of comfort and sightliness were incorporated was a comparatively small amount.

To receive the proper benefit in business from the additional cost, it is necessary that the cars be maintained with the same attention to appearance and comfort as when they are built. Otherwise, the money spent for comfort and appearance becomes a passing spasm, not resulting in permanent accession of good will and business to the utility.

The thought of modernization immediately brings up the question of buses. Probably most people outside the industry and a number in it consider the bus a successor to the street car. We operate buses in every city in which we furnish transportation. In the city of Youngstown one-fourth of our passengers are carried on buses. As a result of our experience we do not consider the bus in any sense a successor to the street car and yet we consider it a useful part of our transportation system and a modern development of help to our operation. Our city bus routes reach parts of the city that were not reached by our car lines. They enable us to give a complete service to all parts of our community when it would be impossible for us, with the exercise of good business judgment, to give the same service by building new street car lines. In some of our communities we were able to operate buses over certain routes on which we would probably never be able to build a street car line, yet the very giving of this service fills out the full measure of duty that as a transportation monopoly we owe these communities.

We have discovered that the so-called rubber urge is simply a figure of speech. There is no apparent difference in the attitude toward our facilities in the portion of the communities we serve with street car lines and the portion we serve with bus lines. On the sole route in the city of Youngstown on which, as a result of purchase of a competing certificate, we operate both street car and bus for the same city service, our bus line is little used. Yet our 72 city buses are a splendid adjunct to our transportation facilities.

On account of the low seating capacity of the bus with its comparatively high operating cost, the average length of haul which can be given profitably for a standard city fare is lower than with the street car, so that the street car must remain the backbone of urban transportation.

Therefore, in making use of this modern vehicle, which in itself is an efficient means of transportation, careful consideration should be given to its complete co-ordination with the existing street car system. The bus is not a substitute for street car service except under peculiar conditions that interfere with proper street car service. It serves no useful purpose as an alternate means of transportation on the same route and with the same rate of fare, but as a supplementary and co-ordinated means of transportation is a great step in the modernization of public transport.

The Readers' Forum

What Constitutes a "Pull-in?"

ELECTRIC RAILWAY ASSOCIATION OF EQUIPMENT MEN,
SOUTHERN PROPERTIES
MEMPHIS, TENN., Jan. 5, 1927.

To the Editor:

We note an editorial in your Dec. 18 issue, "Pull-in Comparisons Not Always Reliable." In the second paragraph you say:

> . . . Last summer at the Chattanooga meeting of the Southern Properties equipment men records of car-miles per pull-in were reported and published in the JOURNAL varying from 5,000 up to 98,000. It seems reasonable to suppose that the methods of determining pull-ins must vary widely in order to obtain such different results.

We wish to state that the members of the Electric Railway Association of Equipment Men, Southern Properties, have a standard classification, a copy of which is shown herein. Their rules for determining car pull-ins, which we have good reason to believe are strictly adhered to, are as follows:

> "A 'Pull-in' is a phrase used by the fraternity designating an equipment failure.
>
> 1. A car which has to be removed from service prior to completion of its regular prescribed run for any mechanical, electrical or man failure, or accident, will be termed a "Pull-in."
>
> 2. Should a car having a failure delay the car following, and even though at the end of the line is repaired or replaced by a tripper, such disabled car shall be termed a "Pull-in."
>
> 3. A derailment that ties up the line shall not be termed a "Pull-in" unless such car be considered defective and sent to the barn.
>
> 4. Should a car having a failure reach the end of the line without delaying the schedule of car following, and there be replaced by a tripper car, such will not be classed as a "Pull-in."

In the last paragraph of the editorial you say:

> For determination of the total record there is some background of opinion for counting every pull-in without reference to cause. These pull-ins can be analyzed to determine those arising from traffic accidents, shop failures or inspection failures. Even on this basis there will be some difficulty in determining a standard, although if no attempt be made to use the figures as a means of discipline much valuable information may be obtained from them.

Following is the list of items for analysis of failures which are used in the comparative statement of car pull-ins on the street car systems of the cities of the Electric Railway Association of Equipment Men, Southern Properties. These are given by months and cumulated for the year to the date of the report.

Chargeable to Carhouse. — Armatures; armature bands; armature shafts; armature bearings hot; axle bearings hot; commutator; brush yoke; brushes and holders; fields; field jumpers; motor leads; gears and pinions; gear cases; other motor trouble; trolleys; circuit breakers; line breakers; main fuse; controller; cables; rheostats; air brakes; safety car equipment; door engines; whistles; frozen air; other air troubles; lights; headlights; signal lights; door switch; heaters; electric bells; lightning; car charged; axles; wheels; journals and boxes; hot journals; hand brakes; slack adjusters; brake rigging; other truck troubles; doors and riggings; door treadles; windows; seats; steps; registers; signs; gongs; sand rigging; fenders; draw bars; snow scrapers; other body troubles; unclassified; total chargeable to equipment; total car-miles; average pull-ins per day; average miles per pull-in.

Not Chargeable to Carhouse. — Accidents; split switches; derailments; doors and steps; broken glass; trouble reported, none found; unclassified; total not chargeable to equipment; average pull-ins per day; average miles per pull-in; total pull-ins; total average pull-ins per day; total average miles per pull-in.

It will be noted from the above classification that it is divided. The first classification shows the mechanical defects, for which the mechanical department is held responsible. The second classification covers pull-ins for which the mechanical department is not held responsible. It is obvious that, with this classification, there should be no difficulty in determining a standard for car pull-ins.

We would appreciate your giving this statement space in your next issue of the JOURNAL, so that the industry may be familiar with the classifications as used by members of the Electric Railway Association of Equipment Men, Southern Properties.

A. D. MCWHORTER,
President.

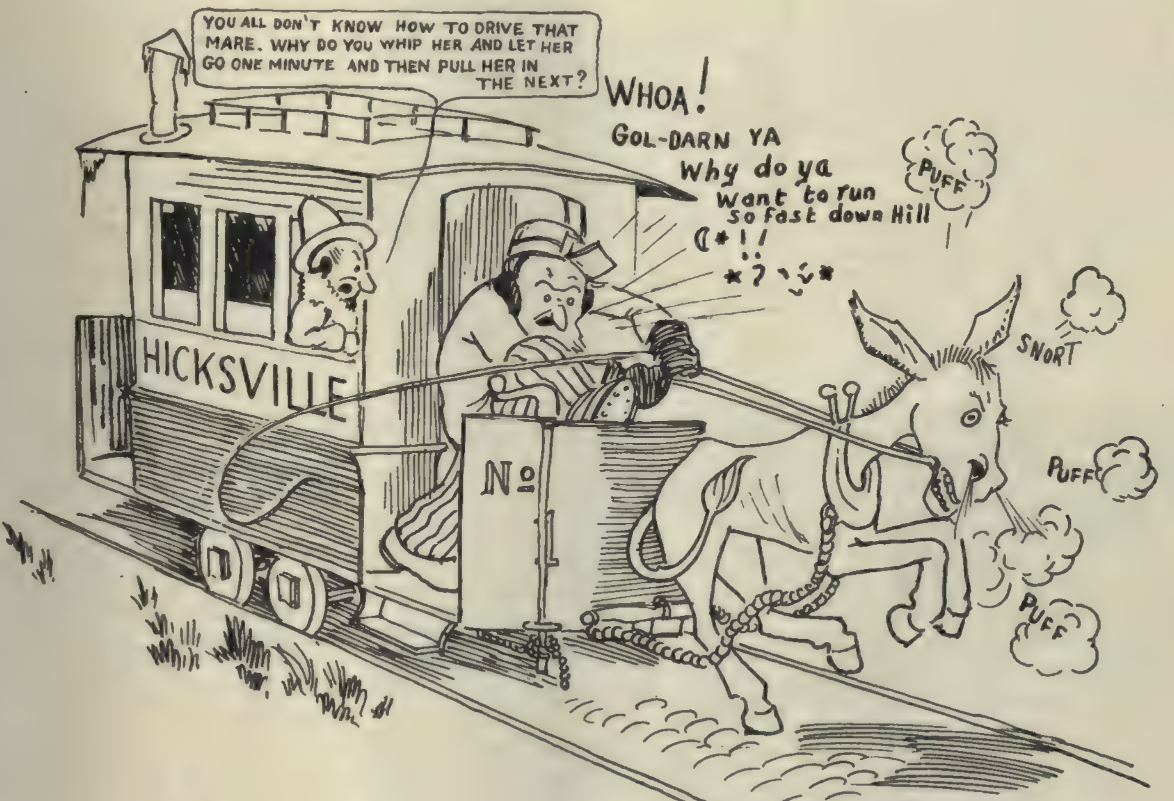
Adventures of

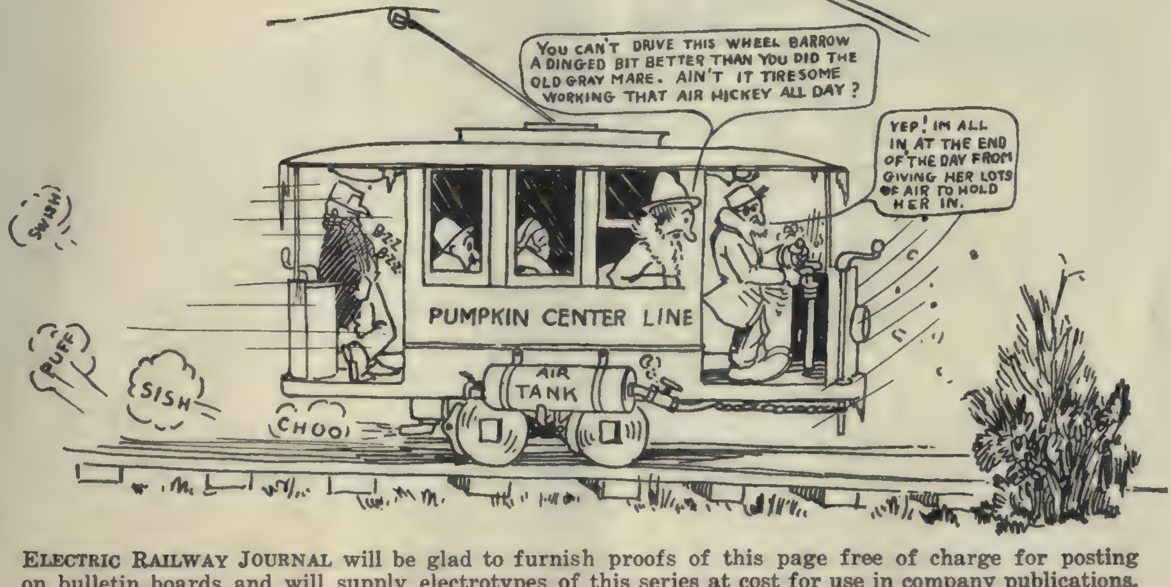
Old Man Trouble on the Hicksville Railway

Save Air, Wear *and the* Old Gray Mare

Eliminate waste, reduce repairs and prevent trouble from worn air valves, governors and compressors by making fewer air brake applications.

There are many motormen who continuously all the way down a hill "monkey away at the air hickey" and make thirteen air applications to every car stop when under average conditions one is sufficient.


YOU ALL DON'T KNOW HOW TO DRIVE THAT MARE. WHY DO YOU WHIP HER AND LET HER GO ONE MINUTE AND THEN PULL HER IN THE NEXT?
WHOA!
GOL-DARN YA
Why do ya want to run so fast down Hill
(*!!
?¬✓
PUFF
SNORT
PUFF
PUFF
HICKSVILLE
№ 1

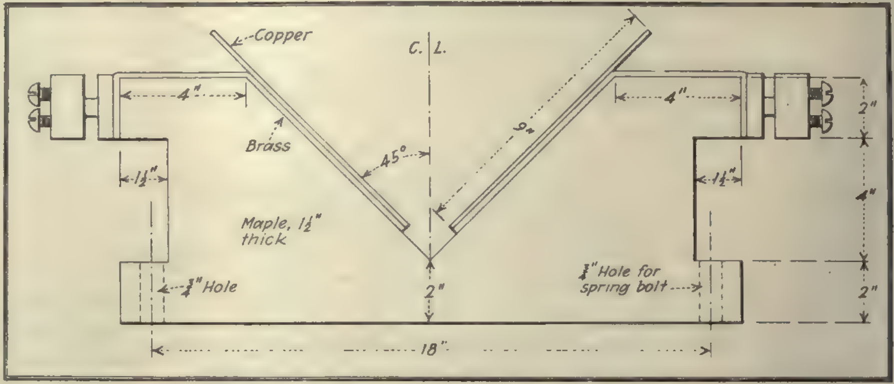

YOU CAN'T DRIVE THIS WHEEL BARROW A DINGED BIT BETTER THAN YOU DID THE OLD GRAY MARE. AIN'T IT TIRESOME WORKING THAT AIR HICKEY ALL DAY?
YEP! IM ALL IN AT THE END OF THE DAY FROM GIVING HER LOTS OF AIR TO HOLD HER IN.
SWISH
BZZ BZZ
PUMPKIN CENTER LINE
PUFF
SISH
CHOO
AIR TANK

ELECTRIC RAILWAY JOURNAL will be glad to furnish proofs of this page free of charge for posting on bulletin boards and will supply electrotypes of this series at cost for use in company publications.

Designed by JESSE M. ZIMMERMAN, *renewal parts engineer, Sketches by* F. L. PROCTOR, *publicity department, Westinghouse Electric & Manufacturing Company.*

Maintenance Notes

Convenient Contact Yoke for Bar-to-Bar Test



Construction of Contact Yoke for Bar-to-Bar Test

WHEN testing armatures by the bar-to-bar method it is common practice to connect the series circuit to commutator bars 90 deg. apart and then to explore the coils with a millivoltmeter, with its leads placed on two adjacent commutator bars.

For making the series current connections to the commutator bars a convenient type of contact yoke is used in the department of electrical repairs of the Brooklyn-Manhattan Transit System, Brooklyn, N. Y. With this yoke, in making the bar-to-bar test, the commutator is placed so as to rest in the V-shaped section. Contact is made to the commutator bars by copper strips, one terminal being connected to ground while the other terminal connects to a bank of lamps the other side of which is connected directly to the line. An accompanying diagram shows the connections in the test as used. Four circuits of five 95-watt lamps each are in parallel. This gives about 0.8 amp. per circuit or a total of 3.2 amp. when all four circuits are connected. The current can be varied by cutting out one or more of the circuits so as to give a convenient deflection of the millivoltmeter. With the armature in position in the yoke the top quadrant is tested and then the commutator is turned to a new position.

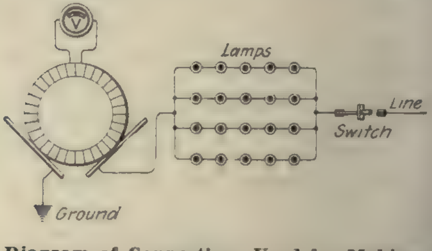
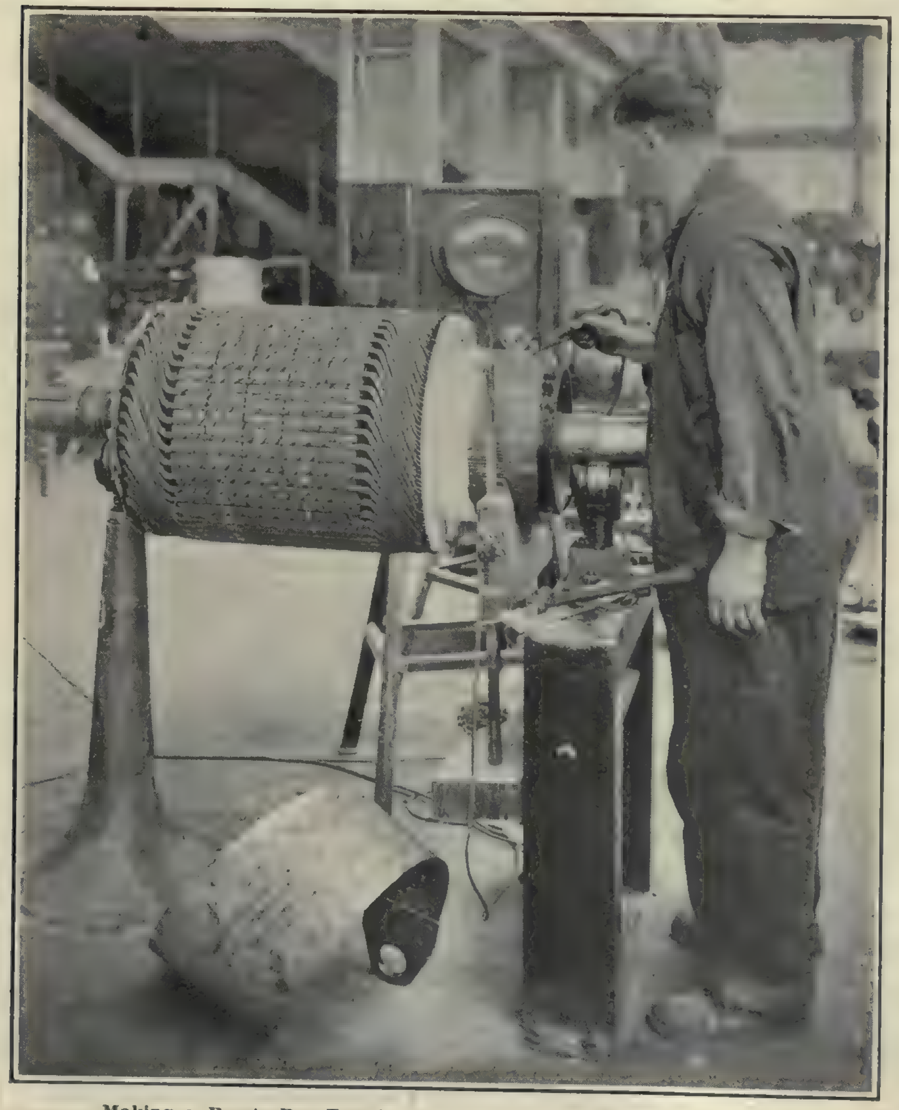


Diagram of Connections Used for Making Bar-to-Bar Test

An accompanying line cut gives the construction of the contact yoke which can be used for testing large armatures with commutators up to 19 in. diameter and for smaller armatures such that the commutator will not pass through the lower ends of the soft rolled copper contact plates. The two faces of the V-shaped notch are arranged accurately 90 deg. apart. Brass strips are screwed to the maple framework and the copper contact plates are soldered to the brass strips, the entire contact portion being held to the maple yoke by screws. The brass strips extend over the edges of the yoke and are provided with ter-



Making a Bar-to-Bar Test in the Department of Electrical Repairs, Brooklyn-Manhattan Transit Corporation minals for convenient attachment of the leads.

In order to provide pressure for the contact between the copper plates and the commutator the yoke is supported on springs. For this suspension two ⅝-in. bolts pass through the extended portions at the lower sides of the yoke and the suspension springs are carried around these bolts. The holes in the yoke for the suspension bolts are located 18 in. apart. For supporting the other end of the armature shaft an ordinary type of armature stand is used. This is adjusted so as to bring the armature shaft nearly horizontal when the commutator is placed in the V.

Pinions Removed by Hydraulic Puller

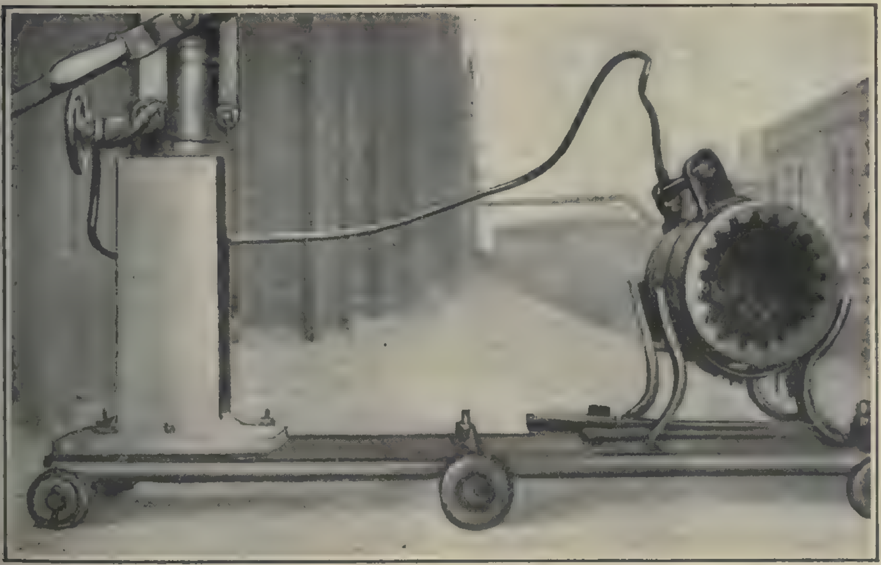
TO SIMPLIFY and hasten the removal of pinions the Interborough Rapid Transit Company of New York developed and is using a simple type of hydraulic puller built in the shop.

This machine consists of a small four-wheel truck upon one end of which is installed a pump pedestal with a hydraulic pump and on the other a pinion collar mounted on a small hydraulic cylinder. The pump and the hydraulic cylinder are connected together with a high-pressure pipe. Pressure in the cylinder may be released by opening a valve controlled by a small hand wheel on the pump pedestal. The pinion collar is bored larger than the outside diameter of the pinion to be pulled, except for a short section about ½ in. from the outer end. In this section are cut the same number of teeth as on the pinion to be pulled. Protruding into the collar from the hydraulic cylinder is a short piston of slightly smaller diameter than the pinion bore.

Puller in Position on Motor. Pressure Applied to Hydraulic Cylinder Forces Short Piston Against End of Armature Shaft

To remove a pinion the truck is rolled to position in front of the motor. The collar is then slipped over the pinion, its teeth passing between the pinion teeth. It is then given a turn to the right so that the collar teeth line up with the pinion teeth. The pump is then operated by hand. As pressure is built up in the cylinder, the short piston is forced out against the end of the armature shaft and the collar teeth pull against the back face of the pinion. Pressure is increased until the pinion is loosened. The collar is then turned back to the left, removed from the pinion and returned to the truck brackets.

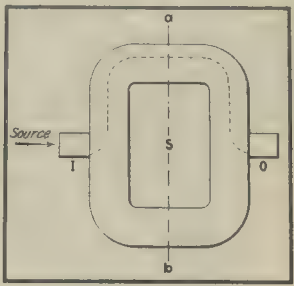
Where various sizes of pinions are in service it is necessary to have a collar for each size.



Hydraulic Pinion Puller Built in Interborough Shop. Arrangement of Teeth in Collar Is Shown at Right

Insuring Correct Installation of Motor Fields

POLARITY tests for railway motor fields are not popular with repairmen. A number of railways have devised ingenuous methods for insuring that the fields when installed give the proper polarity, but few railways follow up this testing consistently. In most cases familiarity of the motor repairmen with the various types of fields and connections are relied upon to insure that they are installed properly. Mix-ups in motor fields occur most frequently with those types which can be reversed either end for end or front side for back side.



With Current Entering at "I" a South Pole Will Be Produced

There are no standard arrangements that can be applied to all field windings. In the more modern types of motors it has been necessary to place the field terminals at the ends of the coils in order to provide clearance for the commutating coils. By the use of open and crossed coils the wiring around the frame of the motor is simplified, but this method requires carrying in stock two types of coils, which adds to the chance of getting the coils mixed when a damaged field is repaired. It is now considered the best practice by railway manufacturers to use cables which come out of the body of the coils instead of employing heavy brass terminals to make the wiring around the frame. The use of this type of coil, however, does not overcome the difficulty of having fields whose proper position in the motor

Too little motor end play may cause a car delay; too much motor end play and there's H . . . to pay.

cannot be determined. Some sort of marking is evidently essential in order to reduce the number of troubles which occur from this source.

As an illustration of the ease with which some types of coils can be installed improperly and the effect which results from installing a new coil in a wrong position an accompanying diagram is shown. This is for a common type of railway motor field coil and the dotted line represents the winding as connected to the two terminals located at the center of either side. If a sketch of this nature be made on transparent paper this can be turned to various positions to show the effect of installing a field coil improperly and is an excellent method of demonstrating to repairmen the wrong effects that will result. With the field coil in a position as shown in the sketch, if the current enters the coil in the direction shown by the arrow, clockwise current will result in the winding, which will produce a south pole at the inside surface of the pole face. If the coil be swiveled around end for end in its own plane, the terminal *O* will become the source of power, so that counterclockwise current will result and a north pole will be produced. If the coil be rotated on the line *a-b* as an axis, the terminal *O* will again be the source of power, but the current in this case remains clockwise and the pole produced is south. Rotation of the coil around an imaginary line *I-O* as an axis gives the same effect as swiveling the coil in its own plane; that is, current circulation becomes reversed, and with it the polarity is changed.

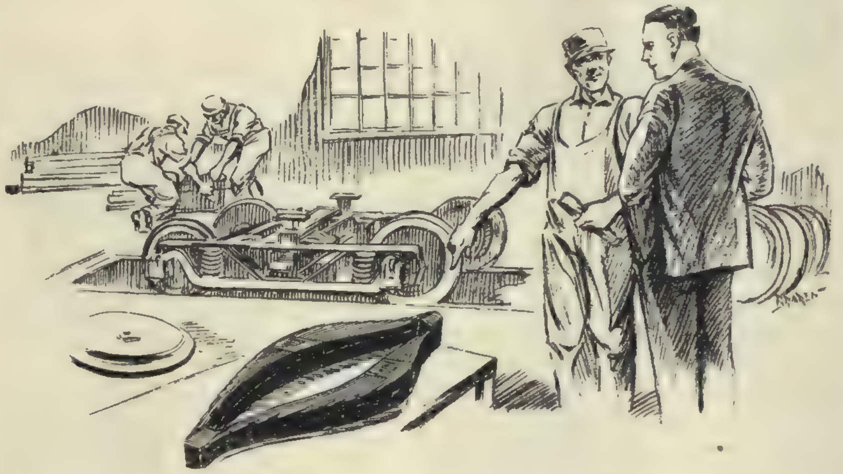
Such a sketch as this can be made up for each type of coil used by a railway and it is particularly applicable to the demonstration of coils, the terminals of which are located both on the same end, or one front and the other rear. Also for compound wound coils which have terminals both at the ends and at the sides, such a sketch makes it easy to show how a mistake in installing the coil may result in reversing one winding without reversing the other.

The principal method which has been used successfully so that a field coil will not be installed improperly is to mark the terminals and to have the holes for the screws which clamp the leads so located that they will indicate which is the top or bottom side of a coil. The practice of the General Electric Company is to mark the two terminals of a field, one *I* and the other *O*. This terminology means inside end and outside end, or, as some railway repairmen have shortened this, "In" and "Out." The Westinghouse Electric & Manufacturing Company uses the letters "F" and "R" to indicate "Front" and "Rear" respectively. If this marking is carefully maintained and the repairmen are made familiar with it trouble from swiveling coils around in their own plane should be reduced.

To prevent coils being turned bottom side up, probably the most effective method is to put screws in only on the top side, so that if the coil is installed bottom side up it will be quite difficult to reach the screws and so to tighten the leads. This requires, however, two types of terminals, and on some railway systems this is considered a particular disadvantage. However, terminals in general are small parts and the carrying of a few more in stock will be more than offset by the damage which will result from wrongly connected fields.

Dick Prescott Discusses a Spring Substitute

And Discovers Bad Practice



DICK PRESCOTT, assistant shop superintendent of the Consolidated Railway & Light Company, was interested immediately in the presence of the wood block under the center bearing of the truck he was inspecting. Joe, the workman in charge of the overhaul gang, looked up as Dick asked the reason for the wood block.

"They put them blocks in there to raise up the body so the brake pull rods don't drag on the motors," he replied.

"Well, are they in there when the cars are new?" asked Dick.

"No, the springs ain't sagged then."

"How much of that do we do?" continued Dick. "Are there blocks like that under most of the cars?"

"Sure, they've nearly all got blocks under the center bearings," Joe replied. "Some of 'em have two blocks when the springs get very bad. Sometimes they put some on top of the journal boxes too."

"While they are trying to get plenty of clearance that way, doesn't that boost the bodies up and make the steps too high?" Dick asked.

"Yeh, sometimes they get pretty high," replied Joe.

"That certainly looks like bad practice to me," continued Dick. "There must be something the matter with our springs."

"We tried getting 'em higher," volunteered Joe. "These full elliptics now are two inches higher than they used to be, but they sag right down and git too low."

"That's funny," commented Dick. "Did they lengthen the bolster links when they put in the higher spring?"

"No, we didn't need to make 'em longer. All we do is t' press down the spring and put the pin in the links."

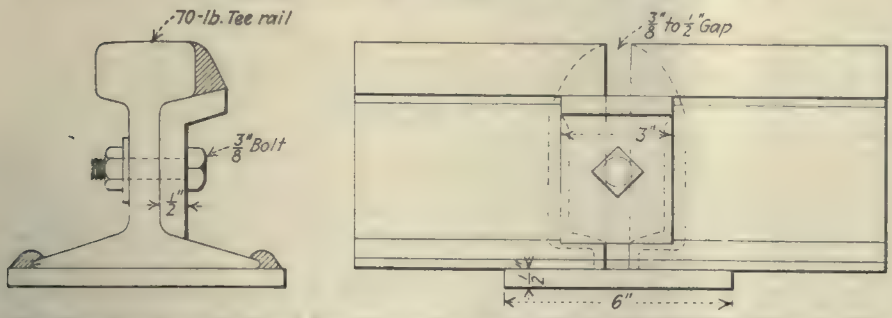
"Oh, I see," said Dick. "But that doesn't help the situation a bit.. All you do is put a heavy initial load on the spring when you assemble the truck. So you get very little, if any, spring action for a light car body. Then when the load goes on you probably exceed the elastic limit of the spring and it begins to sag. As a result we get rough riding cars when they're light and then stick in these blocks to try and keep the bodies up off of the motors. Who specifies the design of our springs?"

"Why, the storeroom jest sends out samples," Joe replied.

"Oh, I see," exclaimed Dick. "That's where the trouble is. We don't know anything about the capacity of the springs we're putting into these trucks. Do we have any drawings of the various types we use?"

"I never seen none," replied Joe.

Rail Joints Welded with Small Plates



Rail Ends Are Separated and the Intervening Space Filled with Welding Metal in This Type of Joint Developed by the Bangor Hydro-Electric Company

GOOD results have been obtained by the Bangor Hydro-Electric Company, Bangor, Me., through the use of an electric welded joint in which small plates are employed to carry the welding metal. Rail ends are separated by a ⅜ to ½-in. gap. A joint plate 3 in. long is held in position by a ⅜-in. bolt passing through this gap and secured on the far side by a washer and nut. Underneath is a base plate 6 in. long.

First the joint is lined up and crowned slightly. Then the base plate is caught by welding all four corners to the bases of the rails. The gap between rail ends is filled, starting at the base and welding up through the web, and at the same time welding through onto the center of the side plate. This is continued until the joint has been welded well up under the head of rails. Then the base plate is welded by starting at the center and welding each way on both sides of the base. This is done with a single heavy layer. The next seams to be welded are those of the side plate. This is done with a single heavy layer as indicated by the dotted lines on the accompanying sketch. Then the gap between the rail heads is welded and the shelf formed by side plates is filled.

This type of joint was designed by the foreman of the welding crew. After three years of service no signs of pounding out or cupping have been noticed.

New Equipment Available

Floodlighting Projector for Long-Range Service

GOLDEN GLOW floodlighting projectors of 24-in. diameter have been placed on the market by the Electric Service Supplies Company, Philadelphia, Pa. The new projector is known as type FLA-2430 and is to meet service conditions such as imposed by the longer railway yards where space for tower location is available only at either end of the area to be floodlighted. This new unit projects a long-range beam of high intensity.

New Projector Which Provides Both Vertical and Horizontal Adjustment

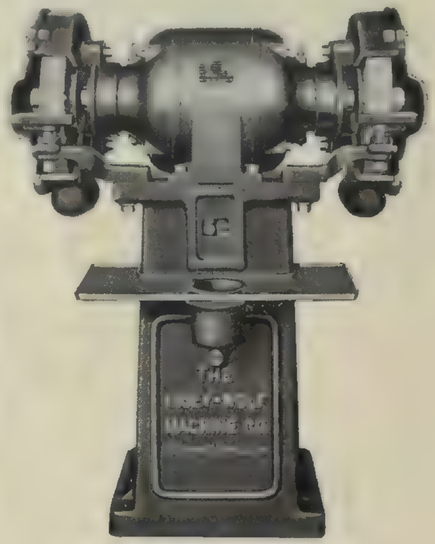
These floodlighting projectors consist of a cast aluminum alloy case, approximately $\frac{3}{16}$ in. thick, equipped with a hinged rear door made of the same material and in which a 24-in. diameter "Golden Glow" or crystal mirror glass reflector is flexibly mounted.

The front of the lamp is regularly equipped with a molded convex lens made of special heat-resisting and annealed glass, approximately ¼ in. thick. The lens is also held in position by flexible retaining clamps, thus resulting in the practical elimination of breakage. The focusing device permits adjustment in both the vertical and horizontal planes. This focusing device is mounted at the top for use with PS-52 floodlighting lamps or at the bottom for use with G-40 lamps, where a highly concentrated beam is desired.

The focusing device is fitted with a Mogul socket. It is adapted for use with standard 1,000 to 1,500-watt type "C" Mazda lamps with the PS-52 bulb for regular floodlighting or the 1,000-watt type "C" Mazda lamps with the G-40 bulb for highly concentrated long-range work. The over-all height is 37 in., over-all width 34 in., weight 125 lb. The entire unit is mounted on a swivel trunnion, allowing for directing the beam of light in any direction and with provision for locking firmly in position.

Motor-Driven Grinding Machines

MOTOR-DRIVEN double-end grinding machines, buffing and polishing machines, with both open-type and incased-type spindle extensions, are being offered in a complete new line by the Hisey-Wolf Machine Company, Cincinnati, Ohio. The driving motors are arranged for both alternating and direct-current service.



Floor Stand Grinder with Two Grinding Wheels

Some of the improved details which have been incorporated in this line of machines are high-grade oversize ball bearings mounted in end heads in close proximity to the wheels. Buffing and polishing machines with incased-type spindle extensions are equipped with four ball bearings. It is recommended that the bearings be lubricated with a good grade of oil, and after the bearing chamber or oil reservoir is once filled it should last for two or three months under ordinary service. Oil chambers are provided with flush or drain-out plugs to permit an occasional cleaning. Wheel guards are adjustable to the wear of the grinding wheel.

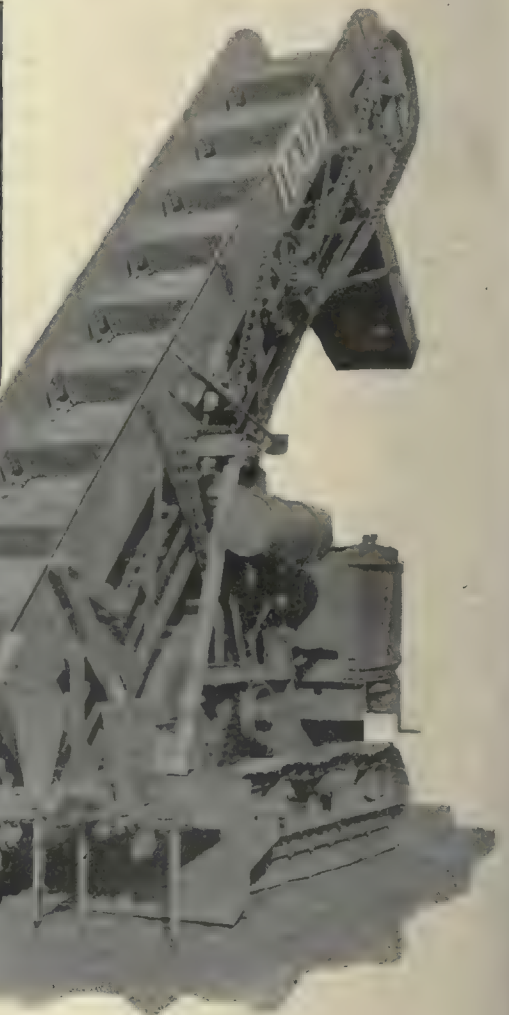
A Big Capacity Snow Loader

SNOW removal is an important and costly item of the winter's work of electric railways and a great deal of engineering knowledge has been applied to devising mechanical devices to lessen the time and labor required for hand shoveling. Snow-loading machines have been on the market for two or three years, but every season sees improvements and the development of new designs. A new type has been brought out this year by the George Haiss Manufacturing Company, New York, N. Y. The Haiss company's portable bucket loaders are said to have proved to be capable machines for digging and loading sand. It has been natural for that company to adapt the sand loader to snow loading, although this has involved the design of an entirely different style of elevating mechanism.

The new snow loader is a creeper-tread-mounted machine with a 37-hp. Waukesha motor and a heavy set of transmission gears and clutches, all housed in one case and running in oil. The snow elevator is a flight or scraper conveyor, with the high flights built as heavy as the buckets used for crushed stone. Quarter-inch steel plate is used with toothed reinforcing edges and side plates, which also brace the bottom of each flight unit. These flights are shaped to prevent dry snow from rolling back over their upper edges. The flights are bolted at each side to endless chain belts which carry them up the elevator at a speed of 140 ft. per minute. Each flight as it comes in contact with the bottom of the snow pile presents its toothed edge at the most effective angle for cutting effect.

Revolving paddles are used for feeding materials from the sides toward the center of the machine. In addition the snow loader has a clean-up scraper immediately behind the paddles to push any spillage back into the pile which is being loaded. The recent 7-in. snowfall in New York gave an opportunity for a thorough test of this machine. The local traction company had plowed and swept the snow from its tracks into windrows 2 ft. high and 7 or 8 ft. wide. The snow was fine and dry, not at all adhesive and, therefore, most difficult to handle. A fleet of five trucks with high sides was gaged each to carry 8 yd. per trip.

With five trucks available the loader put up 100 loads in nine hours. No truck loads were timed to take longer than 1½ minutes and a number were loaded in 60 seconds, or at a rate of nearly 10 yd. a minute. The loader was idle two-thirds of the time waiting for the trucks to dump and return. With ten trucks it would have been easy to put up 200 8-yd. loads in nine hours.



Above, Snow Loader Removing Snow Which Has Been Swept and Plowed to the Side of Car Tracks. At Right, Heavy Type Snow Loader

Reduce the "static" in your equipment and improve its reception, by careful tuning and adjusting.

New Features in Recording Instruments

FOUR new features have been incorporated in the General Electric Company's CR type round pattern recording instruments. The new pen is of greater capacity, with a glass body and metal stylus, and can be refilled without impeding the operation of the instrument. There is a new shipping device, operated by turning a knurled knob on the back. A new polarizing adjustment, by which the instrument calibration can be altered, can be locked in any desired position. There is also a new suspension link of indestructible character, which retains the calibration and sensitivity of the instrument.

The CR recording instruments, for either alternating or direct current, are available for switchboard mounting or as portable instruments. The ammeters are for 5 to 200 amp. and the voltmeters are supplied for any range from 0 to 750 volts. The charts, 8 in. in diameter, are driven by one-day or eight-day clocks or by Warren synchronous motors.

Association News & Discussions

Midwest Association Discusses Service Improvement

DURING a two-day session in Tulsa, Okla., on Jan. 6 and 7, a preliminary report of which was published in this paper last week, the Midwest Electric Railway Association devoted its attention to discussion of ideas for the improvement of service and the development of business. The experiences of representative properties which have made progress and won their way back toward a favorable financial showing were analyzed with a view toward their application on roads which are still in serious difficulty from the standpoint of traffic and revenue.

This kind of collective thinking developed a lively discussion of each of the papers and addresses on the program. The meeting was characterized by the presence on the program of representatives from properties that have won a substantial degree of success, and a decided note of optimism grew out of this first-hand testimony by men whose properties have already profited by the application of modern operating ideas and practices.

R. N. Graham, manager of the railway properties of the Pennsylvania-Ohio System, winner of the 1926 Coffin Award, was one of the headliners on the program. In a paper abstracted at length elsewhere in this issue, he marshaled together the principles on which the success of his property was built. He interpreted modernization to mean more than merely bringing the physical property up to date. This he held to be an important and essential part of an improvement program, but only the first part. He insisted that a railway property must go much further in order to win a substantial number of riders from those who have a choice between the use of private and public transportation. He interpreted modern transportation salesmanship to mean the acquirement of a true commercial outlook on the part of the entire operating organization from management to platform employees. He recommended the advantages of a special commercial department, in which the building of business and the training of transportation salesmen should be the primary responsibilities.

Supplementing Mr. Graham's paper was an address by Charles Gordon, editor ELECTRIC RAILWAY JOURNAL, presenting the equipment situation from the standpoint of the industry as a whole. Mr. Gordon's discussion was illustrated with lantern slides showing the experience of several properties which have made progress in modernizing their equipment. This was translated into an estimate of the economics of the car situation in the entire industry, by a comparison of operating costs on groups of properties with and without modern cars. From these figures it was shown that the industry could buy approximately 12,000 new cars per year out of the excess operating costs attributable to the continued use of rundown and obsolete equipment.

MR. SAWYER DRIVES HOME MODERN IDEA

The climax to the meeting was reached in a straight-from-the-shoulder address by W. H. Sawyer, president American Electric Railway Association. Mr. Sawyer did not mince his words. He introduced his remarks by pointing to the need for plain speaking in the industry. He cited the need for co-operation among transportation companies in the solution of their common problems and complimented the Midwest Association on the excellence of its program and the evidence of renewed interest and enthusiasm shown by the active discussion during the meeting. The opportunity thus afforded to railway men for the interchange of ideas and experiences he held to be the primary advantage of state and sectional associations. In such meetings time is available for a detailed discussion, which is obviously impracticable in a national meeting. While thus commending the purpose and activities of the sectional associations, he made a strong plea for co-operation on the part of all railway men in the work of the national association. "The American Association's policies are carried out by men who have been willing to give of their time and energy in the service of the industry," he said. Only with the co-operation of the industry itself, however, can the work of the national association be made really effective and helpful. He urged that all railway men take a part and an interest in the association's work, and make suggestions for improving its policies whenever such changes seem to be desirable. Mr. Sawyer explained further that association committees are selected with a view to picking men who will actively take part in the work. He pointed out that the results of this effort are not utilized by the industry as they should be and made a strong plea for greater utilization of the association's facilities by all member companies. An abstract of Mr. Sawyer's address is printed elsewhere in this issue.

COMING MEETINGS OF
Electric Railway and Allied Associations

Jan. 18—American Society of Safety Engineers, annual meeting, Cafe Boulevard, New York City, 6:30 p.m.

Jan. 19-20—Central Electric Traffic Association, Keenan Hotel, Fort Wayne, Ind.

Jan. 21-22—Central Electric Railway Accountants' Association, Fort Wayne, Ind.

Jan. 25—New York Electric Railway Association, winter meeting. Hotel Commodore, New York City.

Jan. *26-28*—Association of Equipment Men — Southern Properties, Peabody Hotel, Memphis, Tenn.

Feb. 3-4—Central Electric Railway Association, winter meeting, Toledo, O., Commodore Perry Hotel.

Feb. 4—American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p.m.

Feb. 7-10—American Institute of Electrical Engineers, annual convention, Engineering Societies Building, New York City.

Feb. 10—Central Electric Railway Master Mechanics' Association, Toledo, Ohio.

Feb. 18-19—Kentucky Association of Public Utilities, annual convention, Brown Hotel, Louisville, Ky.

April 26-29—Southwestern Public Service Association, convention, New Orleans, La.

Oct. 3-7, 1927—American Electric Railway Association, annual convention, Public Auditorium, Cleveland, Ohio.

Public relations, popularizing of electric railway service and advertising were handled in papers by Edward F. McKay, manager Oklahoma Utilities Association, and J. B. Donley, assistant commercial manager Pittsburgh Railways. Mr. Donley's paper will appear in abstract in a later issue. Mr. McKay took an unusual angle in presenting the much-discussed subject of public relations. Taking scripture as his proof of the fact that human nature has not changed in its essentials these many centuries, he explained that little new can be said on the subject of public relations. On this point particularly he held that actions speak louder than words. "Performance," he said, "rather than promises, proclaims public relations, and in a language that the public is certain to understand." To emphasize this further, the speaker said that public relations consists in being, not pretending to be, what we ought to be.

Modernization of the interurban railway was discussed by J. M. Bosenbury,

Midwest Electric Railway Association Meets in Tulsa, Okla.

superintendent of motive power Illinois Traction System. The speaker described the methods used on his property for building up carload freight business, pick-up and delivery express and passenger revenue. In all of this work improved equipment and facilities played an important part in providing a character of service which could be successfully merchandised. Intensive selling effort, backed up with widespread advertising and the enthusiastic co-operation of every official and employee on the property, was responsible, according to Mr. Bosenbury, for the success achieved.

Passenger service was improved by the inauguration of the "Tangerine Flier" service with remodeled and repainted cars fitted with semi-parlor car interiors and operating on much faster schedules than had formerly been run. Freight traffic was built up by intensive solicitation of business, negotiation of interchange agreements with steam railroads, provision of more freight equipment and specially designed locomotives with increased capacity but arranged so as to negotiate the short-radius curves on the system and at industrial sidings. Additional substation capacity and belt lines around important cities permitted longer trains to be handled and thus decreased the cost and increased the efficiency of freight handling. Improved signals helped further to expedite movement of traffic. Prompt operating reports helped to check the performance of the entire organization from day to day. Special light-weight and attractive motor trucks enabled the company to undertake the development of pick-up and delivery business at standard express rates. Combined with all of this, co-operation between departments and team work brought about the desired increase in business. Committees were appointed during the progress of this campaign for more revenue, to study conditions and to assist by reports in the development of new operating and merchandising ideas.

New York Electric Railway Association's Mid-Year Meeting

MORNING and afternoon sessions will be held at the mid-year meeting of the New York Electric Railway Association at the Commodore Hotel, New York, on Tuesday, Jan. 25. In addition, the usual banquet will be held in the evening. The morning session will begin at 10 a.m. and the afternoon session at 2 p.m. There will be an intermission for luncheon.

Four papers are to be presented at these sessions, as follows:

"Modern Inventories and Purchasing Methods," by Samuel Porcher, assistant to the vice-president Pennsylvania Railroad."

"Accident Prevention," by H. K. Bennett, safety manager United Electric Railways, Providence, R. I.

"Improvements in Cars and Car Maintenance," by W. C. Bolt, superintendent rolling stock and shops Eastern Massachusetts Street Railway.

"The Accounts, the Auditor and the Operating and Executive Organization," by H. D. Chamberlain, auditor Delaware & Hudson Company.

It is expected that each of these papers will be followed by discussion.

The afternoon session will conclude with a series of moving pictures showing methods of the manufacture of steel wheels, axles, etc., to be presented by George A. Richardson of the Bethlehem Steel Company.

Those intending to attend the banquet in the evening are urged to make their reservations promptly. Tables will be arranged to accommodate eight or ten people. The price of the dinner will be $7.50 per plate, and check should be inclosed with any request for reservations to cover the number of places desired. Request for reservations may be made to the secretary, W. F. Stanton, 267 State Street, Rochester, N. Y., or to any member of the dinner committee, as follows: A. L. Hodges, chairman, Brooklyn City Railroad; H. M. Norris, Interborough Rapid Transit Company; Joseph R. Ellicott, Westinghouse Traction Brake Company; T. R. Langan, Westinghouse Electric & Manufacturing Company; John J. Jordan, Brooklyn-Manhattan Transit Corporation; Ross F. Hayes, 30 Church Street, New York, and W. B. Wheeler, Third Avenue Railway.

Birney Club Elects

ONE-MAN operation, safety devices and modernized cars were the topics considered at the annual meeting of the Birney Club of St. Louis, held at the Missouri Athletic Club on the evening of Jan. 3. E. B. Meissner, president St. Louis Car Company, presided. R. S. Frehse, sales engineer National Pneumatic Company, opened the program with a paper entitled "Circulation of Passenger Load with One-man Operation."

New officers were elected for the coming year, as follows: President, F. A. Richards, vice-president American Car Company; vice-president, E. A. Roehry, general manager St. Louis Electric Terminal Railway; secretary, B. W. Stemmerich, division manager Westinghouse Electric & Manufacturing Company; treasurer, O. E. Turner, special representative railway department, General Electric Company.

American Association News

Making the Railway Popular

NEW traffic can be created for the electric railways and a large measure of public good will can be secured by intelligent energetic efforts, according to the speakers at a meeting of the Metropolitan Section, American Electric Railway Association, held Jan. 7 at the Engineering Societies Building, New York City. "Popularizing Service" was the subject of the meeting, which was in charge of J. T. Hamilton, chairman of the sponsor group committee for the evening.

Traffic and transportation conditions in Europe and in the United States were compared by Lucius S. Storrs, managing director American Electric Railway Association, the first speaker. New cars are being designed in London, Mr. Storrs said, with special attention being paid to popularizing the service. Paris also is experimenting with new cars. Operation of buses by the railway management in districts where no rail facilities exist has done much to win public favor.

Co-ordination of transportation facilities rather than competition is the endeavor throughout Europe, Mr. Storrs said. He cited Berlin as being probably the best example of co-ordinated service. Transportation authorities in that city have adopted as a hypothesis the existence of rail routes without rolling stock and have attempted to visualize the type of car which should be built under such circumstances. Mr. Storrs thought it would be helpful to attempt a similar visualization in American cities by assuming the existence of no transportation facilities whatever and theorizing as to the kind of system which should be created.

L. S. Miller, president New York, Westchester & Boston Railroad, said that "popularizing" is a difficult word for a slogan. He mentioned three characteristics of the American public which should be borne in mind by railway men. These are intelligence, fairness and an unwillingness to have anything "put over." In the past public relations have been conducted too often by lawyers and not enough by the operating men. This situation, however, is gradually changing for the better. "Give service before preaching it," he said. A smile goes a long way to popularize the service. Personal contact with the patrons is extremely valuable. While this existed in former days, it was lost to a large extent after the consolidation of smaller companies into big systems. General policies dictated by the head office of a large system may not always serve local conditions.

W. E. Thompson, vice-president Third Avenue Railway, New York City, spoke of the efforts being made by his company to secure public good will. Radio broadcasting has been effective, he said. C. E. Morgan, vice-president and general manager Brooklyn City Railroad, emphasized a point brought out at a previous meeting of the Metropolitan Section, that the public is interested only in the quality of the service furnished, not in the difficulties encountered by the company in providing that service. He said that a railway passenger is just like a customer in a store, that he favors goods offered in an attractive-looking package and that this thought should be borne in mind in connection with the rolling stock. C. J. Norstrand, general manager Jamaica Central Railways, told of the efforts being made by his company to build up traffic.

Effective methods of dealing with the public were outlined by Leonard Ormerod, advertising manager Pennsylvania Bell Telephone Company. He said that courtesy on the part of the railway employees often demands a considerable effort. At the end of a long, tiresome day it is not easy to greet the patron with a smile. Only by sustained effort can this kind of friendly relationship be maintained. Personal relations between the employees and the public should be augmented by proper advertising, he said. In this connection he stressed the importance of having advertising copy properly represent the company. Cheap advertising is a poor economy, in his opinion. The public is discriminating and judges the advertiser by the quality of his advertising matter.

Traffic and Safety

CONDITIONS of competition for the Anthony N. Brady Memorial Medal formed the principal topic of discussion at a meeting of the committee on traffic and safety held at association headquarters, New York City, Jan. 13. It was the consensus of opinion that it would be impracticable for electric railways at present to comply with the original conditions laid down for this award. The suggestion was made that the award be based on answers to certain simple questions propounded by the committee following the general lines of the Charles A. Coffin Award, and on accident records similar to those reported to the association. It was thought that all transportation facilities operated by a railway or any affiliated company should be included. Recommendation was made that the silver and bronze replicas provided for individuals be dispensed with. After hearing this expression of views of the committee on traffic and safety, T. Fitzgerald, chairman of the committee to formulate conditions, prepared an outline which received the indorsement of the former committee.

A sub-committee was appointed to study the classification of accidents being made by the electric railway section of the National Safety Council. Study will be made during the coming year of recent traffic investigations in Chicago, Baltimore, Detroit, and elsewhere. Copies of the article in ELECTRIC RAILWAY JOURNAL for Jan. 8 outlining the Chicago traffic study are to be distributed to all members of the committee, along with an index of similar studies abstracted in the JOURNAL.

Members present were: Samuel Riddle, sponsor; C. S. Evanson, chairman; F. L. Butler, H. K. Bennett, S. W. Baldwin, A. J. Fink, R. W. Emerson, J. A. Greig, A. G. Jack, J. A. Miller, E. J. Paige, E. S. Rider and J. A. Stoll.

Way and Structures

MEMBERS of the general committee on way and structures and members of various special way and structures committees met at association headquarters, New York City, Dec. 9 and 10, and outlined a program of work for the coming year. Those present included C. A. Alden, E. B. Entwisle, W. G. Hulburt, H. F. Merker, E. M. T. Ryder, A. T. Spencer, C. A. Smith, H. M. Steward, W. W. Wysor and H. H. George, chairman of the general committee. Special committee members present were W. R. Dunham, Jr., C. F. Gailor and E. P. Roundey.

After outlining briefly the work done last year in connection with review of the Manual, Mr. Dunham recommended that the A.E.R.A. specifications for countersunk rivets in the bottom of plates under frogs be changed to conform to those of the A.R.E.A. This was approved.

The desirability of including in all cases drawings of other associations referred to in A.E.R.A. specifications was considered. It was thought that in the case of specifications in general use by the American Electric Railway Association the specifications and drawings should be printed in full in the Manual, but that consideration should be given to special cases where the cost would be large and the use infrequent. If complete details are omitted in such cases reference should be made in the Manual to the publications of other associations where the data can be found.

Splitting the Manual in two or more sections at the time of the next reprinting was discussed. While there was some difference in opinion as to the number of subdivisions which should be made, the committee was unanimous that it should be divided. The committee recommended, therefore, that the next Manual be divided into two or more volumes on departmental lines.

The special committee on switch tongues and hard centers recommended tolerances in the depth of flangeway $\frac{1}{16}$ in. under and $\frac{1}{32}$ in. over when flange bearing and $\frac{1}{16}$ in. under and $\frac{3}{16}$ in. over when non-flange bearing. This was approved. Mr. Ryder reported that the special committee had voted to change the specifications concerning depth of groove from "$\frac{1}{16}$ in. less than the depth of the wheel flange" to read "$\frac{1}{8}$ in. less than the depth of the wheel flange except that the minimum depth of the flangeway shall be $\frac{3}{16}$ in." This committee also recommended the inclusion of a clause to the effect that "when so specified continuous flange bearing shall be provided through crossings and in involved special trackwork except on the inner rail of curves." These recommendations were approved. Blueprints of the standard switch tongue design on which this committee has been working were submitted for inspection.

It was decided to recommend to the executive committee that the special committees on switch tongues and hard centers and on special trackwork be combined. Mr. Roundey reported that the special committee on special trackwork had voted to recommend for approval and adoption as standard by the A.E.R.E.A. the A.R.E.A. drawings for 7-in. and 9-in. solid manganese crossings, steam railroad over electric railway. Discussion of these plans brought out the fact that the only criticism was due to the feeling that there should be clearance on the web between manganese steel and rolled rail so as to insure a tight fishing fit. It was decided to refer the plans back to the A.R.E.A. with the request that it agree to make this revision.

Work for the special committees on rails and on track ballast and drainage was discussed briefly. Mr. Gailor reported that the special committee on arc welding had the necessary data in shape to prepare the preliminary draft of specifications for welding wire.

In connection with the work of the special committee on pavement, it is suggested that investigation be made to discover why different railways used certain types of pavement, the results being obtained, etc.

For the special committee on rail corrugation, Mr. Wysor reported that particular attention will be given this year to vibration tests. Some chemical tests have been arranged for and measurements of corrugation in the field will continue.

Mr. Spencer presented a brief progress report of the committee studying alloy steels other than manganese for special trackwork. An attempt will be made to secure additional data on this subject. Brief reports were submitted by the special committees on motor bus garage design, carhouse and shop construction and wiring and joint railway and bus terminals. Personnel for the special committees on light section rail and on track gage has not yet been completed and these committees had nothing to report.

Stores Accounting

WORK of the committee on stores accounting was outlined at a meeting held in New York Jan. 10. It was decided to concentrate on two subjects, namely, the accounting and handling of gasoline, oil and grease used in bus operation and the accounting and handling of special materials used for construction. Members present were R. A. Weston, chairman; W. S. Stackpole and A. E. Wilkin.

The News of the Industry

Mr. Insull Urges Need for Community Interests

In an address delivered before the annual meeting of the St. Louis Convention and Publicity Bureau on Jan. 12 Samuel Insull, Chicago, made a plea for greater participation by the leaders of industry and business in the solution of the difficult transportation problem as well as in such community matters as recreation and education. Controversies sometimes arise, he said, because such matters are left exclusively in the hands of those people who have a direct and selfish interest at stake.

In speaking on the subject of civic leadership development and responsibility, Mr. Insull cited the need for greater participation by responsible business men in the development and execution of forward-looking civic projects. Under the existing political methods he considered it the exception rather than the rule for a public official to make party or personal interest secondary to that of the general welfare. Frequent changes in administration prevent the execution of a co-ordinated program of major civic improvements. He considered that this was an inherent characteristic of the existing political structure.

Mr. Insull made it clear that he had no criticism to offer of our form of local or state government and considered it the best so far developed. His suggestion, however, was that the business men of a community represent the only element which is in position to take an active part in the formulation of consistent community policies and plans.

The experience of Chicago in the struggle to develop a transportation program was cited as illustrating the need on the part of leaders of business for participation and co-operation. As a result of the transportation controversy there he pointed out that the money invested for the improvement and expansion of this extremely important community service during the last ten years has lagged far behind that made by other utilities.

More Moves in Buffalo Cases

Justice Clinton T. Horton, in Supreme Court at Buffalo, has issued a temporary injunction restraining the city of Buffalo from revoking a number of franchises held by the International Railway. The injunction was issued upon application of counsel for the railway. Most of the lines of the International Railway affected by the threat of the city to revoke franchises on 18 miles of track are operating under terms of consent granted to the old Buffalo Crosstown Railway, merged with the International Railway. The city contends that the company has failed to comply with the terms of the franchise which it assumed at the time it acquired the franchises and obligations of the Crosstown Railway.

Federal Judge John R. Hazel in Buffalo granted the application of the city of Buffalo for postponement until Jan. 20 of the hearing of the railway's equity suit in the United States Court for the Western District of New York to charge a 10-cent fare in Buffalo and increase its rates on all parts of its interurban lines.

No More Service in Newark, Ohio

Hasty Action by Council in Granting Competitive Rights Makes It Appear Unlikely that City, Now Regretful of Its Action, Will Ever See Co-ordinated Service Resumed

THERE appears to be very little prospect that co-ordinated railway and bus service will be restored at Newark, Ohio, by the Southern Ohio Public Service Company or that trolley operation there will ever be resumed by the company. Not since Aug. 10 last, when such service was withdrawn, have conditions changed so as to make the resumption appear desirable from the point of view of the company, although a large and important element of the community wishes that conditions were different from what they really are at present. These conditions are far from satisfactory. That is generally admitted, but there appears to be no present avenue of escape from them.

It did appear at first as though there was a possibility of re-establishing the railway service, as the citizens and the press desired the company to do so. Unfortunately, the City Council had awarded bus operators the right to run competitive services on the same streets the railway was using. The Chamber of Commerce and influential people agreed to do everything possible to induce the railway to re-establish service, but the City Council, having acted on the competitive franchise, was unable to rescind that grant. It would simply have been futile for the utility to re-establish operations either at the same or a higher fare as it would have had to meet parallel operation competitive with its service. Newark could hardly support one transportation service, much less two. The company therefore finally explained this matter to the people and definitely withdrew from the local transportation field. The assistance proffered by those willing and anxious to make almost any concession to have the company continue service had come too late to be of any real assistance.

Every one of these situations has its background. For years railway operation in Newark has failed to pay expenses. Despite this, service has been maintained through two receiverships and after great effort and absorption of heavy losses a new franchise was granted by the city of Newark effective on Nov. 22, 1924. This ordinance relieved the company of certain paving, extended the franchise life for 25 years and allowed the company to charge a fare necessary to pay for the service. It fixed the fare for the first year. The franchise also carried a clause allowing the company to withdraw any portion or all of its rail or bus service if any competitive lines should be granted a permit to operate.

The granting of this franchise was one of the elements which enabled the company to reorganize and emerge from the second receivership. This it did as the Southern Ohio Public Service Company, which operates the light, power and railway in Zanesville, the railway in Newark, and the interurban line connecting Zanesville, Newark and Columbus.

As a part of the reorganization plans the company acquired control of all bus operations in Newark and has been giving the city of Newark a co-ordinated service of rail and bus even at a substantial loss after operating expenses for the combined operation. In accordance with the terms of the franchise, the company asked the Council for an increase in fare to 10 cents cash and four tickets for 25 cents. The Council took no action. After a period of three months the company further, in accordance with its franchise, announced that the new fare would become effective as of March 5, 1926, whereupon an injunction against the increase in fare was obtained, and before final disposition of the injunction proceedings the court declared a vacation.

Not satisfied with this, the Council, contrary to the spirit of the past two years negotiations, granted a competing franchise for an independent to give service paralleling all the company's rail and bus lines at a 10-cent cash fare and tickets at a reduced rate. Sixty days after this fare permit eight buses appeared on the street.

In view of the lack of faith shown by the Newark City Council and the extensive losses sustained by the company during the past several years the company decided to close down its entire local bus and rail service. On Aug. 9 officers of the company met with the men and advised them of its intention. The company, however, allowed its men, thus thrown out of work, ten days wages. On Tuesday night the company ran a full-page advertisement in the local papers outlining the series of events that led to its action and announcing the fact that the service would be discontinued as of that day.

The company's rate was maintained through the injunction proceedings at a 6-cent cash fare with nine tickets for 50 cents.

The franchise granted by Newark is similar to that passed by the city of Zanesville at a prior date. The greater faith of Zanesville has resulted in a high-grade co-ordinated bus and rail service in that city at the same fare asked in Newark. Zanesville is pleased with the service and the relations between the public, the Council and the company are excellent.

The entire situation in Newark was reviewed at length in an article in the ELECTRIC RAILWAY JOURNAL for Aug. 14, 1926, page 268.

Multiplicity of Moves in Chicago

Day-to-Day Agreement Likely—Two New Ordinances Before Council, One of Which Contemplates Unified System with Gross Investment of $1,003,626,000 by 1950—Hearing on Jan. 17 on Latest Project

WITH two freshly received ordinances before it for final consideration—one from the present surface and elevated lines companies, the other embodying the revised Lisman plan for a 20-year grant—the local transportation committee of the Chicago City Council, entering the most critical period of its traction negotiations, received on Jan. 11 a third and still more pretentious plan for the solution of Chicago's local transportation problems. Whether the plan will permanently supersede the companies' unified ordinance now pending or be considered as an independent proposal was not made known.

The new plan was outlined in a letter received by Chairman Joseph B. McDonough and temporarily, at least, pre-empted the others in the Aldermen's attention. It was prepared by Henry A. Blair, chairman of the Chicago Surface Lines and co-receiver of the Chicago Railways, and contemplates the improvement and expansion of surface, elevated and bus lines, with a present value of $273,000,000, into one great unified system representing an aggregate investment of more than $1,000,000,000 by 1950, with extensive subway construction and elevated trackage extensions.

Within the intervening 23-year period Mr. Blair proposes amortization of $134,237,000 of the capital account, with municipal ownership at the end of the period at a cost to the city of $869,000,000. The purchase of this vast system could be brought about, the letter stated, by turning over to the unified company $429,037,000, which will include the old capital account figure of $237,000,000. The figures disclose that in this 23-year period the company would add $156,037,000 to the capital account, while the city would provide $440,352,000 for subway construction by special assessment or other methods. The company would provide funds for all equipment and other properties incidental to operation.

Mr. Blair defended the extraordinarily heavy investment by saying that the investment for rapid transit in 1950 will be only $145 per capita, the same as required by Detroit for its initial rapid transit system. The $145 in Chicago by 1950 is compared with $260 in New York by 1931, he asserted. The rate of return on this investment is placed at 7½ per cent and the amortization at from 1 to 2 per cent, starting in 1933 at the lower figure.

As revealed to the Aldermen, the Blair plan, which was prepared independently of the new terminable unified ordinance of the surface and elevated lines, envisions a complete revolution of transit methods for millions of riders yearly. During 1926 the Surface Lines carried about 870,000,000 revenue riders, or 75 per cent of the traffic; the elevated lines some 224,500,000, or 20 per cent, and the Chicago Motor Coach Company about 60,000,000, or 5 per cent.

Under the latest plan, the surface lines and bus routes will be considered "slow transportation," while the elevated and subway lines will constitute rapid transit facilities. By 1935, it is predicted, 955,000,000 riders will use the surface cars and buses for all or most of their ride and 390,000,000 will use the rapid transit lines. In 1940 the "slow" lines will carry 1,073,000,000 passengers and the "fast" lines about 475,000,000. And by 1950, when the city has a population of 5,000,000, Mr. Blair estimated that the "slow" riders will number 1,200,000,000 and the rapid transit riders some 800,000,000.

Operation of the proposed consolidated system would be on a service-at-cost basis, discontinuing the present policy of paying 55 per cent of the net traction earnings to the city, but with no fare increase, it was pointed out. The ultimate, but not immediate, aim of the plan is to adopt free transfers among the various units in the consolidated system. All of these things and much more in the way of greater convenience and speed, Mr. Blair believes, can be accomplished on an average fare of 7.35 cents, with a maximum fare of 7.71 cents six years hence and a minimum of 7.06 cents at the end of 1950.

In Mr. Blair's opinion, the adoption of this plan will give Chicago the most comprehensive local transportation system in the world.

The first period of construction under this plan would be between 1928 and 1985. In that period it is proposed to build 13.7 miles of subway and 305 miles of elevated structure. Some time before 1931 40 miles of surface lines and 60 miles of bus line extensions would be made and 1,000 new elevated cars and 600 surface cars purchased. During this time three sides of the present elevated loop would be torn down and replaced with subways and all surface lines tracks removed from the streets of the Loop district. A mezzanine floor level would also be built immediately over the tubes for pedestrians. For these improvements the company would advance $113,902,000 and the city $172,920,000.

During the second period of construction—from 1926 to 1940—for which the company would put up $62,520,000 and the city $110,034,000, Mr. Blair proposes to build approximately 10 miles of subways, 21.5 miles of elevated lines and such surface and bus line extensions as will be considered necessary to keep abreast of the city's growth. Between 1940 and 1950, the third period of expansion, 64.5 miles of elevated and subway line are to be added. The company would bear $113,852,000 and the city $157,398,000 of this cost.

Like the other unified surface and elevated line plan which was presented to the committee the same day, in the form of an ordinance drawn by city and company attorneys, the Blair plan cannot be made effective without enabling legislation.

Mr. Blair explained to the Councilmen that "these proposals are submitted by only one of the interested parties," but said that other interests "have agreed to co-operate in efforts to secure unification of the properties and undoubtedly this plan provides a basis for negotiations."

Following the reading of the Blair proposal, the Aldermen returned to the consideration of the ordinance worked out by city and elevated and surface lines attorneys and of the ordinance submitted for a second time by the F. J. Lisman interests of New York. The companies' ordinance, which after nearly three months of preparation was made public this week for the first time, provides for the consolidation of surface, elevated and bus lines into a single new corporation with unified service. It contemplates large extensions of the "L" lines, the building of subways, the operation of feeder bus lines and the expansion of the surface lines system.

Day-to-Day Agreement Likely in Chicago

THE crisis which appears to impend with the expiration of the Chicago Surface Lines' franchises on Feb. 1 may be temporarily averted by a day-to-day franchise extension approved on Jan. 14 by the local transportation committee and the companies. This measure now awaits only the approval of the City Council and the federal court. It includes all the requirements of the existing ordinances, is not to exceed six months and is terminable by either party on thirty days' notice. Meanwhile Mr. Blair's $1,000,000,000 project is scheduled for hearing on Jan. 17.

It is claimed for the proposal made by the companies that it also is a service-at-cost program and no limit is named for the amount of investment needed. The franchise would be held during the good behavior of the proposed consolidated system and regulation of the company would be vested in a local commission. It is, however, subject to enabling legislation which will give the city power to issue a terminable permit.

The so-called Lisman plan, as presented to the Council on the same day, is a rewritten draft of the proposal made to the city several months ago. It proposes to operate the surface cars on a 20-year franchise under present legal limitations, maintain a 7-cent fare, supply $100,000,000 of new capital in 20 years and $50,000,000 for an additional ten years, amortize the entire investment in 30 years and turn the lines over to the city clear of indebtedness. It also provides for compulsory unification of the various properties and for the construction of subways out of the city's traction fund and leasing to the operating company.

The Lisman proposition was subsequently taken up, but detailed consideration of its various parts was deferred.

A fourth plan for settlement of the local traction problem—the proposal of the Chicago Motor Coach Company to substitute buses for street cars in city-wide service—has not yet reached the stage for the drafting of an ordinance. The matter has been in the hands of a sub-committee but the company has asked for more time to submit a detailed franchise plan.

Terms of Detroit Bargain Found Burdensome

The financial agreement entered into by the city of Detroit, Mich., with the Detroit United Railway in 1922 when the city took over the local lines of the railway is imposing a burden upon the system so onerous that some other method must be found to permit the Department of Street Railways to give proper service. Announcement to this effect was made Jan. 6, when John J. Barlum, member of the Street Railway Commission, suggested that a new financial policy be adopted.

Commissioner Barlum, Del A. Smith, acting general manager of the D.S.R., and William M. Hauser, auditor, are of the opinion that refinancing should be brought about in the form of the issuance of 25 or 30-year bonds to replace the mortgage bonds in favor of the Detroit United Railway, which become due in 1931. These mortgage bonds are payable semi-annually in sums of $500,000, with a final payment of several millions due in four years.

Commissioner Barlum suggested that either new bonds be issued, or the fare increased 1 cent. This latter course would probably increase the revenues of the system $3,000,000 annually. He is reported to have said:

> We are suffering from lack of working capital, and there are only two methods by which we can increase working funds. The first would be an increase in fare and the second plan would refinance the bonded debt of $14,000,000. This latter course would save the system $210,000 in interest and also release money paid into the sinking fund to be used as working capital.

Mayor Smith is opposed to any project that would involve an increase in fare.

Under the agreement of 1922, the city paid $2,777,000 to the D.U.R. on the purchase contract for the city lines, which involved $19,800,000. The remainder was to be paid in semi-annual installments of $500,000. The balance is due in 1931.

Rapid Transit Enabling Act for St. Louis

The rapid transit committee of the Board of Aldermen of St. Louis, Mo., has approved the draft of an enabling act to permit the city of St. Louis, Mo., to build a rapid transit system, including subways and elevated tracks, by bond issues and to assess benefits against property served by the new facilities. The measure must be submitted to the Missouri General Assembly for passage.

One-Man Car Accident at Superior

Six persons were reported killed and seventeen injured, three of them probably fatally, when a one-man car running on the Billings Park line of the Duluth-Superior Street Railway downtown bound became stalled on the Great Northern Railroad crossing at 21st Street, Superior, Wis., and was struck by the oncoming "Gopher Limited." Reports of eyewitnesses disclose that the car had stopped as usual at the crossing and then started over the railroad tracks. The record of subsequent events appears to be obscured, but the car was trapped on the railroad tracks when the crossing gates knocked the trolley pole on the car off the wire, cutting off the current. This made it impossible for the car to clear the crossing in time to avoid the crash. The towerman, in charge of the gates at this crossing, testified that he tried to stop the car by putting down the gates, but that the motorman continued ahead until the center of the car was directly in the path of the oncoming train.

The Car's the Thing in Richmond

The Virginia Electric & Power Company is operating on the various lines of its Richmond division two white cars as a part of its present program for merchandising electric railway and bus service. The cars are being run on the different routes for three or four days at a time. Appropriate slogans, in bold but attractive black lettering, are painted on the sides of the cars and in the space on either side on the interior usually given over to advertising. Some of the slogans painted on the outsides of the cars are: "When you ride a street car or bus, you save the difference," "No parking worry," "More economical," "Safest mode of travel," "We appreciate your service," "Come on, folks, ride with us and 'Save the Difference,' Hop on." On the inside, just over the heads of the passengers, the entire length of the cars, reads:

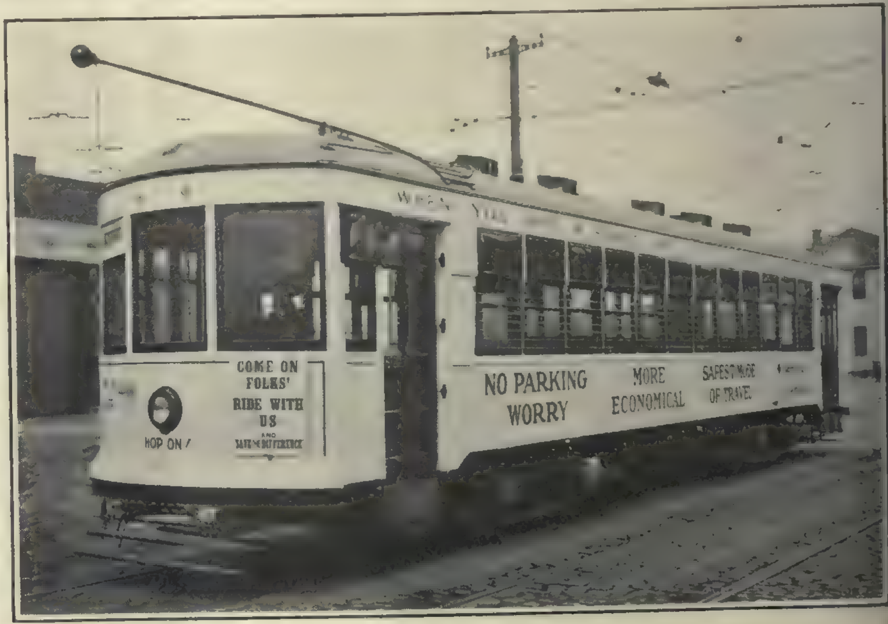
> The present-day electric railway system was first operated successfully in Richmond. Today it saves money for two-thirds of the population of Richmond every day. Forty million people in this country depend on street car and bus service daily. Holidays and workdays, rain or shine, hot or cold, your transportation service is always on the job.

The advent of the white cars was heralded by the placing of cards on other street cars bearing the caption: "Look out for the white cars." This was followed by another, reading, "Have you seen the white cars?"

Other cards being displayed in and on the general run of cars read as follows:

> Your neighbors have no parking troubles. They ride in street cars and buses and save the difference not only today, but every day. Why don't you?
>
> Get acquainted with the man who lives next door and the one who lives on the next block. They're both on this street car.
>
> Shop by street car or bus. All important stores are conveniently located along our lines. No parking worry and you save the difference.
>
> The cops don't tag your street car or bus while you shop. That's why street car and bus shoppers can keep their minds on their shopping.

The program for merchandising electric railway and bus service is being handled by A. H. Herrmann, of the public relations department.



The White Car Is an Important Factor in Merchandising Railway and Bus Service in Richmond

Illinois Employees Seek Increased Wage

Trainmen of the Illinois Traction System, operating from St. Louis, Springfield, Peoria, Decatur, Champaign and Danville, Ill., whose wage agreements expired on Dec. 1, recently asked a 10-cent increase over the present scale of 55 to 70 cents an hour, and having failed to reach an agreement will submit their claim to arbitration. The personnel of the arbitration board has not been decided and pending settlement of the questions involved the system is operating at the old scale, with the new contracts to be retroactive to Dec. 1, 1926. The traction company is said to have advanced a proposal for reduction in wages. Brakemen receive 55 cents, passenger motormen and conductors 67½ cents and freight conductors and motormen 70 cents.

Would Increase Powers of Maryland Commission

An effort will be made to have the Maryland General Assembly, now in session at Annapolis, enact a law which would give the Public Service Commission of the state the authority to suspend proposed rates until the commission can determine whether these rates are reasonable. Under the present law a public utility can change its rates by giving a 30-day notice to the commission. This gives only a short time for the commission to investigate before the change goes into effect.

Several other bills, all backed by the state administration, and dealing with the Maryland Public Service Commission law, have been introduced. They include a measure to require the consent of the commission to abandon franchises acquired and exercised before as well as after passage of the Public Service Commission law; a measure to require the commission's consent for extensions by utilities under franchises which have been exercised before the passage of the law; a measure to empower the commission to fix minimum as well as maximum rates; a measure to authorize joint investigations, hearings and orders in conjunction with commissions of other states or the federal government in cases of interstate utilities.

Parkway Plan in St. Louis Abandoned

The plan for widening Olive Street, St. Louis, Mo., with a parkway set aside for the use of street cars has been abandoned by the aldermanic committee on streets, sewers and wharves. The committee voted unanimously to file the bill presented by the Board of Public Service providing for paving the street with a 23-foot neutral strip for street cars. Had the parkway plan gone through the United Railways intended to put into effect a system of stopping the Olive Street cars only every three blocks between Grand Boulevard and Twelfth Boulevard. The parkway plan had been bitterly fought by property owners along the street. The various steps in promulgating this plan have been referred to from time to time in these pages. President E. R. Kinsey of the Board of Public Service has had new bills prepared providing for the paving of the street from curb to curb.

Virginia Employees Receive Higher Wage

Made possible by the granting by the State Corporation Commission of increased fares for the Norfolk and Petersburg divisions of the Virginia Electric & Power Company, a straight increase in the wages of all trainmen, including motormen, bus drivers and platform men, amounting to 6⅔ per cent of the present wage scale, was announced recently by Vice-President William E. Wood. The recent adjustment of transportation affairs in Richmond and Portsmouth also played a part in the determination of the company to play Santa Claus to its more than 1,000 employees in the four cities. The increase was effective on Jan. 1, the date set for the starting of the new fare schedules, and will total more than $100,000 annually. The employees receiving the higher wage will get approximately $100 more a year in 1927 than in 1926. Employees in the divisions affected are about evenly divided in number between Richmond and Petersburg as a unit and Norfolk and Portsmouth as an entity, it was said. The Richmond-Petersburg interurban and the terminal men also will receive the wage increase.

The latest wage increase is the second since the Virginia Electric & Power Company was taken over by Stone & Webster, Inc., in July, 1925. The last raise was made when the company obtained the right to charge a 7-cent fare in Richmond and became effective on the date of that increase. Sept. 1, 1925.

The new increase, Mr. Wood said, will consume a considerable amount of the additional revenue to accrue as a result of the Norfolk and Petersburg fare increases just granted.

Pittsburgh Paper Praises Men's Effort

THE wage increase that has been awarded the conductors and motormen of the Pittsburgh Railways constitutes recognition of the co-operation of the "platform men" with the management that has been a factor of magnitude in the rehabilitation of the service and the creation of public good will on which the success of the business seems now to be solidly founded. This recognition is thoroughly deserved. It is not too much to say that the courteous attention which conductors and motormen give to the public they serve has done more than anything else to create the popular confidence and trust in the Pittsburgh Railways that is a delightful contrast to the ill-will that prevailed only a few years ago. These men have earned their "raise," will be the common verdict. — *Pittsburgh Gazette Times.*

New York Commission Not Bound by Franchises

Franchise agreements between municipalities and electric railways with limited fare provisions may be disregarded by the Public Service Commission in fixing fares. The Appellate Division, third department, has so decided on an appeal from an order of the commission by the United Traction Company, Albany, N. Y.

The decision was unanimous. In that respect it blocks an appeal to the Court of Appeals unless special exception is given by the Appellate Division and throws the fare controversy involving the company and the cities of Albany, Rensselaer, Troy and others served by the company's system back where it was before proceedings were started for a 10-cent fare last February.

The finding of the court was that the Miller law, passed in 1921, which gave the commission power to disregard local fare franchises, permanently invalidated the agreements. The law was repealed in 1923, but the court held this did not restore the agreements to force.

Counsel for the company declared repeal of the Miller law did not affect the validity of the ruling of the commission in 1922 within the scope of its authority fixing a 7-cent rate.

Clever Holiday Gifts at Levis

In accord with the spirit of Christmas, the Levis Tramways, Levis, Que., made two kinds of gifts to its patrons combining convenience and ride salesmanship.

During the period Dec. 24-Jan. 10 purchasers of the weekly pass were presented with a leather pass case, an unusual feature of which is the sealing in of the owner's name and address to assist recovery of a lost case and its contents. The pass case was delivered free during the holiday season, when there is a tendency for sales to fall off, but even after the holidays the pass case will be available at cost price. Incidentally, it is worth mention that the December, 1926, revenue of the Levis Tramways constituted a record.

The second gift is one that was invented by H. E. Weyman, general manager, to meet a real need. Mr. Weyman found that many a parent was averse to having the children ride to and from school because younger children are especially prone to lose their tickets, or, if they have a purse, to lose the purse too. He therefore originated a ticket wrist purse for presentation to anyone who bought $1 worth of school tickets or $1.80 of adult tickets during the period mentioned. Thereafter, these purses will be available to patrons at cost. Railways interested in this helpful way of selling rides may secure further particulars by writing to Mr. Weyman.

A pleasing feature of these gifts was a paper slip in French, which, translated, read substantially as follows:

> JUST A BRIEF WORD
>
> The little things that one gives; the little actions that one does; the little things that provoke a smile or a jest—all of these are just so much to the good in making life worth while.

Ohio Committee Issues Informative Pamphlets

Seventy-five thousand students of Ohio junior and senior high schools and vocational training schools are studying a school booklet recently issued by the Ohio Committee on Public Utility Information. It is a 56-page booklet, entitled "Aladdins of Industry," and was compiled by the Ohio committee for use of students in English, current topics, science and social science classes, and for reference in preparing debates. It deals with the history and methods of operation of the electric railway, electric light and power, gas and telephone industries. At the end of each chapter suggestions are given for classroom work on the text of the chapter and a number of suggestions for classroom work on new topics, designed to help those students who desire to learn more about each industry on which they must depend to carry on successfully in the present day and age.

Among subjects discussed in the chapter on electric railways are the dynamo, the first complete and practical system, the interurban, the motors, controllers, and starting resistance, the propulsion of the electric car, air brakes, third-rail system, cost of cars, safety-first measures, the rush-hour peak, and various problems of the street railway, including increased riding and fare variation. The 69 electric railway companies in Ohio have track and equipment costing more than $300,000,000, according to the booklet, and operate a total of 3,038 miles of track. In 1925 they carried 871,509,382 passengers; paid taxes of $6,098,010, and operating expenses of $55,439,846.

These booklets are being supplied free of charge to school students in Ohio upon request of school authorities. While the first booklets have been off the press only two months requests for them are rapidly nearing the 100,000 mark. These requests have come so far from more than 600 Ohio schools.

Court Decides Against Chicago Company on Paving

Reversing the decision of the Circuit Court, the Illinois Supreme Court has ruled in favor of the city of Chicago against the Chicago Surface Lines in a suit over payment of the cost of relaying tracks to conform with the widening of 22d Street in that city. The decision will mean an immediate saving of $315,000 to the city, according to Corporation Counsel Busch, and an eventual saving of several millions. It would also aid the city in the present transit negotiations. Other improvements that would probably be affected are the relaying of tracks on Indiana Avenue, costing $200,000, and the removal of tracks at the municipal pier, costing $100,000, Mr. Busch predicted.

Work Started on Maine Road

Preliminary work for the construction of an electric railway across the northern part of Maine has been started. The proposed route, which is known as the Quebec extension, is to be built by United States Senator Arthur R. Gould. It will be 111 miles long with terminals at Washburn, Me., and Lake Frontier, Que. The early work now under way in the Washburn section consists of clearing the right-of-way by cutting down trees and underbrush. Camps are being established along the course and crews will be started as needed to cut ties and poles to be used in the actual construction of the line. Transportation facilities have long been needed for business progress in this and other sections of Maine that are rich in timberland. This project was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Jan. 1, 1927, page 57.

Would Sell Forty-five-Cent Ticket in Fort Worth

The Northern Texas Traction Company has asked the city of Fort Worth, Tex., for a revision of the railway fares in that city. The wholesale distribution of transportation that is suggested is the sale of a ticket good for a week the bearer of which may ride the street cars for 5 cents as often as he desires. The ticket is to be sold for 45 cents. For persons who ride seldom a cash fare of 10 cents is suggested, while three tokens may be bought for 25 cents.

The company explains that it is earning a net return on its investment of less than 2 per cent and that new money cannot be secured with that meager showing of earnings. But the company points out that it has constantly improved its service and made it more extensive. The company is "selling" its plan to the people of Fort Worth by newspaper advertising and in many other ways.

News Notes

Fare Hearing Postponed.—Hearing upon the petition of the United Traction Company for increased fares in Albany, Troy and Rensselaer, scheduled for Jan. 12 at 10 a.m., was postponed until Jan. 31 at Albany. The hearing will be continued on Feb. 1.

Increases Interurban Parlor Car Service.—The Northern Ohio Power & Light Company, Akron, Ohio, has placed another modern parlor car in the Canton-Akron-Cleveland service. Others will be placed in the interurban service just as soon as they can be built. These cars seat 50 passengers in individual chairs. There is no extra fare. The time from Akron to Cleveland is one hour and 25 minutes.

Christmas Party a Huge Success.—The sixteenth annual Christmas party was held by the Beaver Valley Traction Company, New Brighton, Pa., on Dec. 21 last. Among the happiest of the guests were the boys and girls of the Beaver County Children's Home, who were transported in a large coach of the Beaver Valley Motor Coach Company to the Junction Park pavilion. The ladies of the Home for the Aged were also the happy recipients of a similar courtesy from the company. Plenty of goodies were provided and in addition boys and girls were presented with dolls, games, mechanical toys and marbles. There were many hours of happiness and fun. Officials and committee men of the company worked indefatigably to make the sixteenth annual party a success.

To Advance Safety Cause.—The Public Service Commission on Jan. 6 directed the New York State Railways to cause all car movements over its crossing of the Pittsford-Palmyra highway No. 776, about 1 mile east of Pittsford, to proceed at a speed not in excess of 5 miles an hour. Motormen are ordered to sound car whistles within a distance of 150 ft. of the crossing and to continue the sounding until the train is over the highway. Evidence submitted at a hearing before Commissioner Van Voorhis showed that the highway was heavily traveled and the view on both sides of the crossing of approaching cars was obstructed to such an extent that additional protection was required.

Increased Rates Delayed.—The Public Service Commission has extended the date on which the Nashua Street Railway, Nashua, N. H., was to put into effect its proposed fare increases from Jan. 10 to Feb. 10. The extension was authorized to allow time to take up further matters relative to the proposed changes. The city of Nashua is objecting to the proposal of the railway to issue fourteen-ride tickets for $1, all of which must be used in one week. The City Council wants the tickets issued without any time limit. A vote was taken by the Board of Aldermen, which was unanimously in favor of no restriction of time tickets.

Transfers Made Larger in St. Louis.—The United Railways, St. Louis, Mo., has enlarged the size of its transfers to facilitate their handling by conductors. The new ones measure $5\frac{3}{8}$ in. x $1\frac{13}{16}$ in., about the same size as the transfers used prior to last October. At that time transfer regulations were changed to prevent improper use by car riders and new transfers were printed which were much smaller in size. However, it was found that these were entirely too small, so that very often the names of lines were punched out. The transfer regulations have not been changed, and the company will continue to use pink slips in the mornings and white slips between noon and midnight. The new transfers have fifteen-minute intervals so that a conductor can more clearly indicate time for transfer to a new line.

Insurance Policies as Christmas Gifts.—Employees of the Illinois Power & Light Corporation, Chicago, Ill., received insurance policies as 1926 Christmas gifts from the company. Along with a holiday greeting many old policies were renewed and new ones issued. The gift includes all employees eligible in the following company groups: Illinois Power & Light Corporation, Illinois Traction System, Iowa Power & Light group, Missouri Power & Light Company, and the Kansas group of properties. The card announcing the $500 life insurance policy gift extended best wishes for the holiday season and expressed a hope that each person who received a card would be a member of the corporate family when another Christmas came around.

Recent Bus Developments

More Delay on New York Bus Applications

Chairman Delaney of the Board of Transportation of New York City called on the Mayor on Dec. 12 and informed him it would be physically impossible to report to the Board of Estimate on Jan. 13, as directed last Monday, an analysis of the 40 or more amendments and supplementary data to bus franchise applications which had been filed in the last few days.

Mayor Walker then decided that he would have to defer presentation of his formal resolution on the awards until the regular meeting of the Board of Estimate on Jan. 20. Mr. Delaney assured the Mayor that he could complete his analysis by that time.

It was explained that while the Mayor deeply deplored further delay, his determination to lay the matter over was made so that the city might have every opportunity to peruse the latest offers made by bus franchise applicants and to investigate the financial responsibility of each competing bidder.

Until the unexpected reversal of policy following the consultation between the Mayor and Chairman Delaney every indication pointed to the probability of a deadlock on Jan. 13 in the Board of Estimate if the Mayor persisted in his declared intention to force the issue to an open vote.

Ordinance Would Eliminate Jitneys in Miami

Action on the passage of a new bus and jitney ordinance was deferred recently by the City Commission of Miami, Fla., in order to permit all interested groups to offer suggestions for the solution of what is admitted to be an intricate transportation problem. The ordinance, which had its first reading in December, 1926, will virtually eliminate jitneys in the close-in downtown business section, leaving buses as the major passenger vehicles. The bus lines have assured the city that routes now being served with jitneys will be supplanted with buses in the event the jitneys are taken off.

The new ordinance is so worded that only financially responsible and well-equipped lines can qualify to operate and dependable and regular service to the public must be furnished at all times. Also, city officials claim, simplification of the transportation system and elimination of jitneys in the close-in business district will reduce traffic congestion and represent a saving of thousands of dollars annually to the city by dispensing with extra police and traffic supervision.

About a year ago, when transportation facilities were inadequate, the city decided to add buses to relieve the situation and also to serve territories not heretofore reached. An agreement was made with the Miami Beach Railway whereby the latter was to operate buses for the city. The city guaranteed the actual operating cost of the coaches only, but in turn was to receive half the net profits. The railway advanced the funds for the purchase of 50 buses.

State Law Requirements on Motor Vehicles Sustained

In a series of decisions without written opinions, the United States Supreme Court on Jan. 10 dismissed four cases which sought to invalidate state laws requiring registration fees for motor vehicles and imposing gasoline taxes. The effect is to sustain state laws with these requirements. On the authority of prior decisions involving similar questions, the high court dismissed the cases on the ground of lack of jurisdiction. In all four cases the lower courts had held that there was no cause for action; that the registration requirement was a reasonable state matter, and that the gasoline tax was a tax on sales and not on use.

Missouri Bus Lines Would Be Placed Under Commission Control

Senator McCawley has prepared a bill placing control of all bus lines under the Missouri Public Service Commission and granting that body the authority to refuse to license a bus line when in its opinion the territory is now properly served by a steam railroad or electric railway. The measure would apply alike to either strictly city bus lines or those which operate between cities. In effect the bill would consider bus lines as public utilities, and as such their schedules, routes, rates and practices would be subject to the supervision of the state commission. Under the provisions of the measure, when a bus line applies for a certificate for any route the commission must immediately send notice of such application to every steam railroad and electric railway operating in the territory in which the bus company plans to give service, and also to every city and town through which the bus line would pass. The bill would confirm the rights of existing bus lines, but charges the commission with the responsibility of hereafter deciding whether the evidence overcomes the presumption that such lines are necessary.

Buses in Topeka Do Big Service

In all 23 buses are in daily use on five regular runs in Topeka, Kan., with a total daily mileage of nearly 2,600. This figure has been increased somewhat by trippers, which go on during peak-load periods in the morning and in the evening. The average daily mileage for each motor coach on a regular run totals about 180.

This service is being supplied by the Topeka Railway, owned by the Illinois Power & Light Corporation. On Feb. 1, 1925, the bus service was started by the Topeka Railway as a supplement to its railway service. The first run was a trifle under 5 miles for the round trip. At that time the company owned only five buses. Three railway lines have been abandoned in Topeka and bus service substituted. In other districts the coaches act as auxiliaries and feeders to the existing transportation system.

One Small Line Temporarily Abandons.—The Stroudsburg, Water Gap & Portland Railroad, operating between Portland and Stroudsburg, Pa., ceased operations on Jan. 1. The line will resume service again on June 1. Meantime the company will run a bus to accommodate school children from Water Gap. This line is operated by the Stroudsburg Traction Company.

Buses Replace Cars.—The Shawnee-Tecumseh Traction Company substituted bus service in Shawnee, Okla., for railway service on Jan. 9. The company also substituted buses for trolley equipment on its electric interurban line between Shawnee and Tecumseh. The plan is to put in force improved service on its lines as a result of the change. The buses in Shawnee are to have a fifteen-minute schedule instead of half hourly service maintained by the street cars. Between Shawnee and Tecumseh a 40-minute service will replace the hourly schedule on the interurban line. The company will use 21-passenger buses. The railway equipment will be sold.

Abandonment Conditional Upon Bus Operation.—The Public Service Commission granted on Jan. 5 the petition of the New York & Stamford Railway for approval of a declaration of abandonment of all that portion of its route in the village of Port Chester on Westchester Avenue, and all that portion in the village consisting of its routes on South Regent Street and North Regent Street. These portions of the road constitute a loop outside of the main track of the road on which operations are to continue. The village of Port Chester consented, conditional upon removal of rails and poles and the operation of bus routes on substantially the same route.

First Fatal Bus Accident in Kansas City.—In 3,000,000 miles of bus operation by the Kansas City Public Service Company, Kansas City, Mo., the first fatal accident occurred there Christmas Day, when a 39th Street bus struck and killed Mitchell F. Burch, an eleven-year-old boy who dashed into the path of the bus after a new Christmas football. The railway began operating buses in Kansas City in October, 1925.

Buses Substituted.—The New York Public Service Commission approved on Jan. 7 the petition of the Lewiston & Youngstown Frontier Railway for permission to abandon portions of its lines in Youngstown and the town of Porter, Niagara County, N. Y. This line has been under lease to the Niagara Gorge Railroad. No objection was raised at the hearing by the city authorities or others to its abandonment. Buses have been substituted for service in the village. The railway is directed to remove all existing structures from the streets and highways along the abandoned route and restore the streets to a condition as good as adjacent parts thereof.

Financial and Corporate

Financial Readjustment Suggested for Boston "L"

Attention is called by *Barron's* to the fact that common shares of the Boston Elevated Railway, Boston, Mass., recently sold at 87, close to the highest price recorded since 1922, and up ten from the 1926 low of 77. In connection with the recent demand for the stock, that authority says, it is of interest to note that in the portion of the report of the Division of Metropolitan Planning which outlines a suggested readjustment of the Boston Elevated Railway the statement is made that "it is our belief that the stocks of the new corporation will, under normal conditions, sell at par or better . . . "

The proposed new corporation is the Boston Transit Company, and under the division's plan Boston Elevated common stockholders would receive for each present share of 6 per cent stock a share of 5 per cent common stock in the new company, the dividend on which would be guaranteed by the state for 40 or 50 years, or whatever period of public control might be decided upon. It is the conviction of the Planning Division that the long-time state guaranty would not only compensate for the 1 per cent reduction in dividend but would in normal times add fifteen points to the present market value of the stock.

As *Barron's* points out, there is not the slightest certainty that the plan recommended by the Planning Division will be adopted by the Legislature or accepted by the stockholders, but that commentator says it is worth noting that, in the opinion of the division, if a plan is put through substantially as recommended it would result in both the 4½ per cent preferred and 5 per cent common stocks of the new company selling at around par.

The present holders of the outstanding preferred stock of the Boston Elevated Railway would under the plan receive for each share new 4½ per cent preferred on the following basis: Present 8 per cent preferred, not more than 1.3 shares; 7 per cent "third preferred," 1.05 shares. Unlike the common, the preferred stock of the new company would carry a guaranty that at the end of a new period of control the state would purchase the stock of the owners at par if they so desire. An arrangement such as that mentioned would in effect lend to the stock the status of a Massachusetts bond, except in respect to exemption of the income return from federal supertax.

Receiver Named for Kansas Interurban

Judge Reeves of the federal court at Kansas City, Mo., on Jan. 8 appointed John F. Layng of the Buchanan & Layng Corporation, New York, receiver of the Union Traction Company, Coffeyville, Kan. The railway was incorporated under the laws of Kansas on Jan. 14, 1904. It operates 67 miles of line in and between Coffeyville, Independence and Cherryvale and Parsons, Kan. It owns the entire capital stock of the Kansas-Oklahoma Traction Company. The road is on private right of way except in Coffeyville. It also owns and operates the line between Parsons, Kan., and Nowata, Okla. The road and equipment are carried in the balance sheet at $2,456,085. There is outstanding $1,203,762 of funded debt.

Loss on San Francisco Municipal $315,830

For the Year Ended June 30, 1926, This Loss Shows an Increase of $10,668 Over the Year Ended 1925—Excess of Income Over Operating Expenses, Depreciation and Accidents Was $7,131

Total revenue of the Municipal Railway of San Francisco, San Francisco, Cal., for the year ended June 30, 1926, was $3,409,965, against $3,281,498 the year before. Interest on securities owned fell off to $43,467. A consideration of detailed operating expenses shows an increase in every account, leaving the total of $2,705,146, or $160,426 greater than in the year 1925.

The report, prepared for and approved by the finance committee of the Board of Supervisors, explains that for the purpose of securing a comparison between the results of operation of the municipally owned utility and similar utilities operated by private capital the charter of the city and county of San Francisco provided that the operating reports should include certain comparison charges consisting of items which constitute part of the actual cost of operating privately owned companies but which the municipally owned utility is not required to pay. These charges in 1926 amounted to $322,961, leaving a net loss of $315,830 for the year. The deficit in the cumulative account from Dec. 28, 1912, to June 30, 1926, was $1,645,378.

Items in the balance sheet are listed in detail. Capital assets include road and equipment, $8,245,107, and general expenditures, $324,872. Current assets consisted of $860,946 securities bought for the depreciation fund, $26,202 in accounts receivable and $170,149 in materials and supplies. The item of deferred assets was the same figure of $132,123. Thus the total assets was $10,817,735. Current liabilities included accounts and vouchers payable, $267,916, and interest on funded debt, $40,845. The reserves included a depreciation of $1,117,484 and a reserve for compensation of $127,756.

The Municipal Railway has no capital stock and the excess of its assets over its liabilities represents surplus. This surplus has been divided into two classes, a contributed surplus and a surplus from income. The contributed surplus includes an item of $26,000,

COMPARATIVE INCOME ACCOUNT, MUNICIPAL RAILWAY OF SAN FRANCISCO

	—Year Ended June 30— 1925	1926	Dec. 28, 1912 to June 30, 1926
Passenger revenue	$3,268,383	$3,395,950	$32,079,523
Miscellaneous revenue	13,115	14,015	137,485
Total revenue	$3,281,498	$3,409,965	$32,217,009
Interest on securities owned	44,595	43,467	404,736
Total income	$3,326,093	$3,453,432	$32,621,745
Operating expenses:			
Way and structures	$115,073	$134,911	$1,049,905
Equipment	197,619	200,365	1,893,471
Power	464,990	488,812	4,323,507
Conducting transportation	1,600,499	1,694,704	14,295,324
Traffic	....	....	3,836
General and miscellaneous	166,333	186,351	1,317,054
Loss on road retired	....	....	8,184
Total operating expenses	$2,544,515	$2,705,146	$22,891,284
Other deductions:			
Taxes—motor bus	205	....	205
Total operating expenses	$2,544,720	$2,705,146	$22,891,489

	—Year Ended June 30— 1925	1926	Dec. 28, 1912 to June 30, 1926
Excess of income over operating expenses	$781,372	$748,286	$9,730,256
Less: Interest on funded debt	186,678	177,133	2,738,774
Excess of income over operating expenses and interest	$594,694	$571,153	$6,991,482
Less: Reserves for depreciation and accidents	588,308	564,022	5,726,167
Excess of income over operating expenses, depreciation, accident reserves	$6,385	$7,131	$1,265,315
Less: Charter comparison charges	311,548	322,961	2,910,693
Net loss	*$305,162*	*$315,830*	*$1,645,378*
Analysis of comparison charges:			
State franchise tax	$172,279	$179,036	$1,689,869
Municipal franchise tax	130,735	135,838	1,090,731
Municipal car licenses	3,135	3,135	36,528
Federal income tax	....	....	13,270
Salaries of clerks	....	....	4,872
Law expenses	....	....	13,500
Insurance	5,398	4,951	61,920
	$311,548	$322,961	$2,910,693

Italics indicate loss or deficiency.

COMPARATIVE GENERAL BALANCE SHEET, MUNICIPAL RAILWAY OF SAN FRANCISCO, AS OF JUNE 30, 1926

Assets:	1926	1925	Increase or *Decrease*
Capital assets	$8,570,280	$8,317,283	$252,997
Current assets	2,115,331	2,146,136	*30,805*
Total assets	10,817,735	10,595,543	222,191
Liabilities, reserves and surplus:			
Funded debt	$3,590,100	$3,791,000	$*200,900*
Current liabilities	308,761	383,995	*75,234*
Reserves	1,469,225	1,476,143	*6,918*
Contributed surplus	356,552	332,552	24,000
Surplus from income	5,093,096	4,611,851	481,244
Total surplus	$5,449,649	$4,944,404	$505,244
Total liabilities, reserves and capital	$10,817,735	$10,595,543	$222,191

Italics indicate loss or deficiency.

premium on funded debt and contributions from general taxes, $306,552. In surplus from income is included $1,984,100, an item actually set aside for bond retirement. Of this amount the item of $1,887,000 represents bonds redeemed and canceled and the item of $97,100 cash.

An item of considerable interest is the charter reserve of $1,414,258 for insurance and taxes, which is part of the sums set aside for comparison with private operation explained above. The report states that as the municipal system does not have to pay any of these charges the receipts from operations were deposited in the operating cash fund without any restrictions as to how they were to be used. Most of the cash in the operating fund represented by such comparison charges was actually spent in new construction and addition and betterment work, so that these reserves representing obligatory comparison charges have in reality been used as reserves for betterments. For the purpose of making the balance sheet reflect the actual result of operations the amount expended in addition and betterment work has been reflected in an account entitled "Additions and Betterments from Income," and the charter reserves for insurance and taxes carry a balance equal only to the unused portion of the original reserves. The amount included in the additions and betterments is $2,874,570.

The net loss on bus operation for the year was $33,046, against $16,987 in 1925.

STATEMENT OF BUS LINE OPERATIONS, MUNICIPAL RAILWAY OF SAN FRANCISCO YEAR ENDED JUNE 30, 1926

Revenues:		
Passenger earnings	$53,467	
Quartermaster's tickets	$5	
School tickets	1,067	
Local transfers	18,358	
Total revenue credits		$19,431
Total passenger revenue and credits		$72,898
Operating expenses:		
Repairs to buses	$13,282	
Tire expense	9,627	
Gas and oil	13,477	
Cleaning, washing and greasing	10,179	
Conductor-chauffeurs' wages	36,323	
Depreciation	6,748	
General and miscellaneous	16,307	
Total operating expenses		105,945
Net loss for year		$33,046

STATISTICAL DATA, MUNICIPAL RAILWAY OF SAN FRANCISCO FISCAL YEAR ENDED JUNE 30, 1926

	Total Amount	Per Car-Mile	Per Car-Hour
Total passenger revenue	$3,395,950.24	$0.3651	$3.5321
Total operating expenses (taxes and depreciation not included)	2,705,146.10	0.2908	2.8136
Total operating earnings (taxes and depreciation not included)	690,804.14	0.0743	0.7185
Ratio of earnings to passenger revenue	0.2034		
Total taxes and charter charges	322,961.61	0.0347	0.3359
Ratio to passenger revenue	0.0951		
§Depreciation	564,022.09	0.0606	0.5866
Ratio to passenger revenue	0.1661		
Operating expenses, depreciation and taxes	3,592,129.80	0.3861	3.7361
Ratio to passenger revenue	1.0578		
Net deficit from operation	*196,176.56*	*0.0210*	*0.2040*
Ratio to passenger revenue	*0.0578*		
†Passenger car mileage	9,302,073		
‡Passenger car-hours	961,451		
Platform expense (67½ cents per hour July 1, 1925, to April 15, 1926. 72½ cents per hour April 16, 1926, to June 30, 1926.) Bus operators 5 cents per hour additional. Time and one-half for overtime after eight hours; and after ten hours range; time and one-half for seventh day work. Twelve days vacation per year with pay	1,413,684.62	0.1520	1.4704
Number of passenger cars owned	209		
Number of work cars owned	6		
Total number of cars owned	215		
Total number of buses owned	13		
Total number of cars and buses owned	228		
Passengers carried—5-cent fares	67,285,956		
5-cent fares—government tickets	35,385		
2½-cent fares—school tickets	1,156,110		
2-cent fares—revenue transfers	301,441		
Free transfers	14,062,150		
Free passengers—employees	549,866		
Total passengers carried	83,390,908		
Number of passengers carried per car-mile		8.96	

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§The sum of $201,000 expended from depreciation fund for bond retirement.
†Includes car mileage of buses.
‡Includes car-hours of buses.
Transfers lifted at Fillmore and Union Streets treated as revenue transfers pending result of present litigation with the Market Street Railway.

Italics indicate loss or deficiency.

Operating surplus of the Municipal Railway of San Francisco is made up as:

Operating surplus		*$1,311,956*
The following is an analysis of the above:		
Surplus, June 30, 1926		*$1,052,316*
Credits: Transfers from depreciation fund to operating fund to cover deficits in the latter	$95,420	
Insurance refunds credited to compensation reserve but deposited in operating fund	337	
Adjustment of reserve for bond redemption	3,900	99,657
		$952,658
Debits: Interest on securities credited to income but deposited in depreciation fund	$43,467	
Amount transferred from income account	315,830	359,297
Total		*$1,311,956*
Total surplus from income		$5,093,096
The total suplus derived from the operations of the road is as follows:		
Bonds retired through income		1,887,000
Reserve for bond redemption		97,100
Advance general fund—Twin Peaks Tunnel		82,152
Advance general fund—Stockton Street Tunnel		18,971
Advance general fund—Ocean Shore Railroad switching		1,000
Charter reserves		1,414,258
Additions and betterments from income		2,874,570
Operating surplus		1,311,956
Total		$5,093,096

Italics indicate loss or deficiency.

The total single track mileage as of June 30, 1926, was 74.12. The total bus route mileage as of that date was 7.40.

Another Step in New Haven Acquisition

The New York, New Haven & Hartford Railroad, New Haven, Conn., which a short time ago received the necessary approval from the municipalities served by the Worcester Consolidated Street Railway, Worcester, Mass., and the Springfield Street Railway, Springfield, Mass., to take over and control both railways, has taken the next step in order to commence rehabilitating both properties.

Before the New Haven can start actual work, the act passed by the 1926 Legislature provides that the New York, New Haven & Hartford Railroad shall acquire all the common stock of the New England Investment & Security Company, present owner, which also controls the voting stocks of the two electric railways. The New Haven has entered into an agreement with all holders of this stock, through which the railroad will deliver $290,000 par value, of the fifteen-year notes of the Investment company, for all the common stock. The New Haven owns $13,115,000 of these fifteen-year notes. The exchange is expected to take place shortly, and the New Haven will have full control of both railways with the power to operate these utilities subject to the approval of 75 per cent of the municipalities served.

Refunding of Illinois Power Debentures Proposed

In view of the present favorable condition of the money market and the excellent investment standing of its securities the Illinois Power & Light Corporation, Chicago, is in a position to refund its 7 per cent debentures, now outstanding in the principal amount of $9,614,800, by a new issue of debentures bearing a substantially lower rate of interest, probably 5½ per cent, at a very considerable saving to the company.

In conformity with the charter and by-laws of the company, it is the intention to retire the debentures, by purchase or redemption, on or before April 1, 1927, and to create, issue and sell new debentures or debenture bonds in a principal amount not to exceed $9,500,000, bearing interest at a rate of not to exceed 6 per cent, and with such maturity or maturities, and redeemable at such price or prices, as may be determined by the directors. The new debentures will probably be dated as of March 1, 1927, and issued about that time. The principal amount of the new debentures will not exceed the amount of the debentures at present outstanding.

Receiver Named for Missouri Property

Frank C. Schwenk, Allenton, Mo., was appointed receiver on Dec. 30, 1926, by Circuit Judge McElhinney at Clayton, Mo., for the Grand View Railroad. This property formerly operated an electric line along Lemay Ferry road in the southern part of the county. The line extended from Broadway and Mary Avenue, Luxemburg, to Continental, Mo. It was formerly known as the St. Louis, Montesano & Southern Railroad. Even in the pre-bus days the line was not a money maker, but was able to keep going because a large cement company had contributed to its upkeep so as to provide service for its employees.

Operation ceased a year ago with the permission of the Missouri Public Service Commission. The application for the receivership was made by the St. Louis Union Trust Company, trustee for a $100,000 bond issue of the railroad. Mr. Schwenk will sell the property.

Notes Issued in Minneapolis.—The Yellow Cab Corporation, Minneapolis, Minn., the stock of which is now controlled through recent purchase by the Twin City Rapid Transit Company and is being operated in connection with that company's electric and bus lines subsidiaries, has made a new issue of $250,000 of 6 per cent serial gold notes to be dated Jan. 1, 1927, and to mature $50,000 a year beginning Jan. 1, 1928. The first two maturities are priced respectively at 100.96 and 100.93 and the remaining three at 100. The issue is being financed through Lane, Piper & Jaffray, Inc., Twin Cities. The corporation operates taxicabs in the Twin Cities, Duluth and Rochester, Minn.

Financing of Purchased Company Approved.—Permission was granted to the Public Service Rapid Transit Railroad by the Public Utilities Commission on Jan. 8 to issue $210,000 of common stock. The proceeds will be used for the acquisition of the property of the North Jersey Rapid Transit Company and other capital purposes. The line is to be included in the Public Service Corporation group.

Personal Items

W. H. Taylor a Vice-President of U.G.I.

William H. Taylor, nationally known in public utility circles as an expert in appraisal and rate matters and in general consulting engineering work and vice-president and general manager of the Georgia Railway & Power Company, Atlanta, Ga., since 1923, has been appointed a vice-president of the United Gas Improvement Company, an additional position having been created. He will assume his new duties on Feb. 1.

W. H. Taylor

Mr. Taylor has been connected with the United Gas Improvement properties for more than 23 years. He has been head of its plants in Gloversville, N. Y.; Charleston, S. C., and Omaha, Neb. He is a graduate of Stevens Institute of Technology and an engineer by profession. He began his active career in 1903 as a constructor with the United Gas Improvement forces. He has risen step by step through the engineering, management and construction departments to the position of vice-president and general manager of outlying properties. When in 1923 he became vice-president and general manager of the Georgia Railway & Power Company he took over supervision of the various departments, assisting H. M. Atkinson, chairman of the board, and P. S. Arkwright, president.

Mr. Taylor's offices will be in the central U.G.I. building in Philadelphia.

Changes in Fond Du Lac

Alvin E. Gerg, who has been connected with the Wisconsin Power & Light Company since 1918, has resigned. Mr. Gerg was in charge of the commercial activities of the company in Fond du Lac, Sheboygan and Oshkosh, Wis.

Frank J. Cottrill, district sales manager of the Wisconsin Power & Light Company at Fond du Lac, prior to which he was commercial manager of the Iowa Railway & Light Company at Cedar Rapids, has been promoted to succeed Mr. Gerg.

Louis R. Schichler, a member of the sales force of the Wisconsin Power & Light Company, has been promoted to succeed Mr. Cottrill.

Harry Reid Heads National Electric Power Group

Victor Emanuel, chairman of the board of the National Electric Power Company, New York, has made the following announcement of changes in the personnel of the officers and directors of the company: Samuel Insull is now chairman of the company and Victor Emanuel has resigned as chairman. Albert Emanuel has resigned as president and has been succeeded by Harry Reid, Indianapolis, Ind., formerly president of the Interstate Public Service Company and the Kentucky Utilities Company. Albert Emanuel, Thomas O'Hara, L. E. Yeager and Charles W. Yant have resigned as members of the board of directors and have been succeeded by Samuel Insull, Martin J. Insull, Harry Reid and C. B. Ziegler. Victor Emanuel, A. C. Allyn, Charles D. Makepeace, W. H. Seibert and R. E. T. Riggs will remain as directors of the company.

Included among the properties in the National Electric Power group is the Cumberland County Power & Light Company, Portland, Me., operating the Portland Railroad. It is understood that the change in personnel contemplates the removal of Mr. Reid to New York, his new headquarters.

Promotions by Byllesby

At a meeting of the board of directors of H. M. Byllesby & Company on Dec. 31, A. S. Cummins, assistant manager of the bond department, and O. G. Corns, sales manager of the Western offices, were made vice-presidents.

Mr. Corns' first position, in 1901, was with George D. Cook & Company, after which he joined Mason, Lewis & Company. He later joined E. H. Rollins & Sons. Leaving E. H. Rollins & Sons, Mr. Corns took charge of the sales department of Allerton, Green & King, and in 1915 became associated with H. M. Byllesby & Company.

Mr. Cummins has been connected with the Byllesby organization since 1909. His early experience was in the operating department of the Northern States Power Company at Minneapolis. In 1907 he became vice-president of the Caribbean & Southern Steamship Line, then a subsidiary of H. M. Byllesby.

At the outbreak of war Mr. Cummins joined the military service. He was a captain in the Air Service. At the close of the war he rejoined H. M. Byllesby & Company, in charge of wholesale and syndication work. He has been in direct charge of the sale of securities under the customer-ownership plan.

Tri-Cities Properties to Merge—Changes in Personnel to Be Made

The management of the Tri-City Railway of Iowa and Illinois will be united under one head effective on Feb. 1, according to an announcement made by R. B. McDonald, president of the local companies of the United Light & Power Company.

R. J. Smith, at present general manager of the Tri-City Railway of Iowa, will become manager of both companies, succeeding T. C. Roderick, who has been appointed vice-president and general manager of the Ottumwa Gas Company. Mr. Smith will also continue his duties as general manager Clinton, Davenport & Muscatine Railway.

Mr. Roderick has been with the railway for approximately seven years. He entered the utility service as assistant to J. G. Huntoon, when the latter was general manager of both the Iowa and Illinois properties.

William J. Wuestenfeld, general manager of the Ottumwa utility, will go to Davenport as assistant general manager of the People's Light Company, filling the vacancy created by the appointment of C. R. Stahl, former assistant general manager, to the position of general manager Panhandle Light & Power Company at Borger, Tex.

A few years ago, when J. G. Huntoon retired, the two companies were placed under separate management. This arrangement has been continued until the present.

George C. Towle Will Leave Scranton

George C. Towle, affiliated with the Scranton Railway, Scranton, Pa., since June, 1926, will sever his connections with that property on Feb. 1. His railway service has covered a period of 37 years, during which he was engaged for the greater part of the time on Stone & Webster properties and later on the American Railways properties.

Early in his career he was appointed master mechanic of the Allentown & Bethlehem Rapid Transit Company, Allentown, Pa. He resigned a year later to become superintendent of the Biddeford & Saco Railroad, Biddeford, Me. Here he remained for three years. At this period in his career he engaged for a brief time in the manufacturing end of the business, but returned to the operation end to take charge of the Houghton County Traction Company at Houghton, Mich. Two years later he was transferred to Ponce, Porto Rico, where for two years he had charge of the construction of the Ponce Railway & Light Company.

Nor were his activities to end there. His next move included the management of the Mattoon and Charleston properties of the Central Illinois Traction Company, Mattoon, Ill., and association with the Syracuse & South Bay Electric Railroad, Syracuse, N. Y. In 1906 he was appointed general manager of the People's Railway, Dayton. He withdrew from the management of the People's Railway early in 1920 to take charge of the rehabilitation of the Logansport Utilities Company. In 1920 he joined the forces of the Dayton Pneumatic Tool Company, where he served until 1926, when he returned to an American Railways property, this time at Scranton as superintendent of transportation.

When they learned of his intention to resign his position at Scranton, the employees of the Scranton Railway, through a committee, expressed their regret that they would no longer be affiliated with him in a business way. Then, as a testimonial of the regard in which he was held, a pocketbook was presented to him containing a substantial sum of money. Mr. Towle has no definite plans for the future.

G. W. James, Jr., with "Journal"

G. W. James, Jr., has joined the staff of the ELECTRIC RAILWAY JOURNAL as assistant editor. He will be located in New York. Mr. James is by profession an engineer, but he was reared in the atmosphere of journalism, his father having been an editor for 50 years and with the exception of the late Colonel Watterson was probably in service longer than any other editor in the South.

Mr. James attended the Virginia Polytechnic Institute, taking civil engineering and later took a course in electrical engineering at the Virginia Mechanics Institute. For seven years thereafter he was in the maintenance of way department of the Virginia Railway & Power Company. He also had much other engineering experience, notably with the Virginian Railway, Turner Construction Company, the Foundation Company and the Chesapeake & Ohio Railroad. During this entire time he was writing special articles for newspapers, contributing book reviews, etc., and more recently was engaged in editorial work for the Western Electric Company and the Chesapeake & Ohio Railroad on their house organs.

In his newspaper work Mr. James was connected with the Richmond *Times-Dispatch*, Richmond *News Leader*, the Norfolk *Virginian Pilot*, the Richmond *Journal* and the Richmond *Evening Journal*. This is only part of the record of the man, but it does indicate the wide experience Mr. James has had as an engineer and a publicist.

Obituary

Alves Dixon

Alves Dixon, general manager of the Baton Rouge Electric Company, Baton Rouge, La., died recently at El Paso, Tex., to which city he had returned to enjoy a vacation with his family, among old friends in familiar scenes. Shortly after his arrival he was taken sick and later he died in a sanatorium where he had been confined a few months.

No one knew El Paso and its immediate surroundings better than Mr. Dixon, who had seen it grow in the 21 years he had known and loved it. To this Empire city located on the border line, with the mountains of New Mexico in the distance, went Alves Dixon in 1904. He became a motorman for the electric company. Quickly did he advance through various positions in the ranks until he assumed the rôle of general superintendent of railways. In that position he accomplished a great deal for the people of that city. He improved schedules, kept equipment up to date and schooled the operators in the lessons of competence, courtesy and carefulness.

In appreciation of his efforts and successes Stone & Webster proposed to promote him to the managership of the Baton Rouge Electric Company, Baton Rouge, La. Then was the opportunity presented to the residents of El Paso to show Mr. Dixon how much they thought of him. A novel parade was staged on June 20, 1925, in which citizens from all walks of life took part to speed the parting executive on his way to Baton Rouge. Many will never forget an interesting feature of the parade—the first mule car ever operated in El Paso. On this car rode Mr. Dixon and a notable group of El Paso citizens. Forty-three years before the car had made regular trips between El Paso and Juarez. There was also a celebration in honor of the accident record of the company, April, 1925, making the best showing of any month during the past fifteen years. This was due to the efforts of Mr. Dixon himself, with whom safety was a hobby.

The late Alves Dixon was active in public life. At one time he was president of the El Paso Country Club, president of the Rotary and the El Paso Social Club. In addition he was secretary of the Texas Sons of the Revolution, member of the Spanish War Veterans and Veterans of Foreign Wars. He was active also in the affairs of the Southwestern Public Service Association.

In his death the Stone & Webster properties have lost a valuable railway man and the utility industry one of its outstanding personalities.

C. E. A. Carr

C. E. A. Carr, engaged recently in the railway supply business at Toronto, Ont., died on Dec. 30 in that city as a result of complications following an operation for appendicitis. He was born in Thornton, Ont., 56 years ago, and before going into the business in which he was engaged at the time of his death he had been in utility work in the United States and Canada for many years. Mr. Carr was graduated from the high school at Barrie, Ont., in 1883, and then studied at the British-American Commercial School, Toronto, until 1886. He was in the office of the Toronto city engineer from 1888 to 1891, and from 1892 to 1894 was secretary to the general manager of the Toronto Railway, the Montreal Street Railway and the Cleveland Electric Railway. From 1895 to 1905 he was general manager, secretary and treasurer of the London Street Railway, London, Ont. During his connection with the London company Mr. Carr also was general manager and secretary of the Montreal Park & Island Railway. From 1905 to 1908 he was with J. G. White & Company as manager of the Helena Light & Railway Company. He was also at one time manager of the Quebec Railway, Light & Power Company.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

St. Petersburg Railways Allotted $400,000 for Improvements

Under the new bond issue approved early this year by the city of St. Petersburg, Fla., $400,000 has been appropriated for improvements for the municipal street railways system. These improvements include track extensions for three blocks on First Avenue, 21 blocks on Ninth Avenue, and special work in various parts of the city. A new carhouse estimated to cost $105,000 equipped with all modern facilities, and storage tracks are included in the approved plan. Work will be completed by July 1. Combined revenue from the city's four public utilities is reported at more than $1,000,000. An allotment of $235,000 has been made for improvements to power plants.

Great Northern to Spend $12,000,000 for Equipment

Ralph Budd, president of the Great Northern Railway, announces that $12,000,000 will be spent during 1927 for new equipment, materials and supplies, including rails. Motor-generator types of electric locomotives will be placed in service over the Cascade Mountains during the coming year. In addition, the company is experimenting with a large oil-electric locomotive in its Minneapolis Terminal, with a view of determining whether the extensive use of this type of motive power is practicable.

New Pole Concern Expects 30 Per Cent Cedar Trade

By acquisition of the principal assets of the National Pole Company and the National Pole & Tie Treating Company the National Pole & Treating Company, a newly formed corporation, expects to do 30 per cent of the business in cedar poles for electric railway lines in the United States.

Record Shipment of Electric Locomotives to Long Island

Fourteen electric locomotives, comprising the largest single shipment of its kind ever made, was delivered to the Long Island Railroad recently.

These locomotives have been stored by the company to await the completion of the Bay Ridge Division, where they will be used in shifting service.

Fourteen Electric Motive Power Units Recently Delivered to the Long Island Railroad to Be Used in Shifting Service on the Bay Ridge Division

Each locomotive is rated at 1,000 hp., weighs 75 tons and can be operated at a speed of 25 m.p.h. At a speed of 12.4 m.p.h. the drawbar pull is 44,200 lb. They can be operated individually or for heavy service, two in multiple as a two-cab locomotive. It is claimed that when so operated they constitute the most powerful shifting engines ever built. The mechanical parts were built at the Altoona shops of the Pennsylvania Railroad, from where the record shipment was started. All electrical equipment was supplied by the Westinghouse Electric & Manufacturing Company.

These locomotives represent one more step in the development of the electric service of the Long Island Railroad. They are designed for the purpose of establishing a standard switching locomotive, not only for the Long Island Railroad, but for the Pennsylvania Railroad System in general.

Since 1905, when the first electric lines were placed in operation, the electrified track-miles of the Long Island Railroad have risen from 64 to 300, current consumption from 20,000,000 to nearly 200,000,000 kw.-hr. a year, number of multiple-unit cars from 187 to 904, car-miles from 3,500,000 to 35,000,000 per year, and passengers carried annually from less than 10,000,000 to 100,000,000.

N.E.M.A Selects Quarters in Graybar Building

Headquarters of the National Electrical Manufacturers' Association will be removed to the new Graybar Building upon its completion April 1, it was announced this week.

This move will place the association in the new business center of New York City and within 200 ft. of the Grand Central Terminal. In addition to its work of collecting and disseminating statistics of the electrical industry the association is continuing the work of its committee on uniform cost accounting, which during the year 1927 will keep in close touch with the various departments of the United States government.

Gerard Swope, president of the General Electric Company, is president of the association, and its vice-presidents are: C. L. Collens, president of the Reliance Electric & Engineering Company, and D. Hayes Murphy, president of the Wire Mold Company. J. M. Perry, general manager of the electrical department of the Johns-Manville Manufacturing Company, is treasurer, and the affairs of the association are in charge of Alfred E. Waller, managing director.

General Electric Big Prize Winner at Sesqui Exposition

Of the prizes awarded at the recent Sesqui-Centennial International Exposition at Philadelphia, the highest award given, two grand prizes, three medals of honor and nine gold medals, in addition to a number of lesser awards, were won by the General Electric Company.

One of the grand prizes was awarded for "systems of electric transportation and traffic regulation devices." This recognized the company's endeavors in the field of electric locomotives, street car equipment, automobile motors, Novalux traffic signals and aviation beacons. The other grand prize was given for "excellence of products and service given humanity."

One medal of honor was presented for "gas-electric system of drives for buses," one for "G.E. Mazda lamps" and one for "turbine super-charger."

Gold medals were awarded as follows:

For "automatic induction voltage

regulator as typical of apparatus of this class made by exhibitor," for "a.c. and d.c. motors," for "direct-current generator—marine type—as typical of machines of this class made by exhibitor," for "electric fans of high quality," for "an electric mine locomotive fitted with automatic cable reels of high efficiency," for "emergency automatic throwover switches mounted on vertical steel panels," for "motor-generator set typical of machines of this class made by exhibitor" and for "type H transformers."

Later Predictions Substantiate "Journal's" Prophecies for 1927

Outlook Considered Promising by Business Men and Financiers—Rumors of Labor Trouble in Mining and Railroad Circles Are the Only Dark Clouds on the Horizon

DURING the past two weeks reams of statistics and predictions have substantiated the JOURNAL'S retrospect of 1926 and prophecies for 1927, as published in the statistical number Jan. 1. Confidence is the keynote sounded by business men and financiers in the various reviews that have appeared during the fortnight. Solidity for 1927, both for industries in general and the electrical field in particular, is predicted.

First and foremost, Secretary Mellon reports the financial structure of the federal government in excellent condition. The national debt is below $19,500,000,000, compared with a peak of $26,500,000,000 just after the war.

A study of the general business index chart for 1926 reveals that business did not rise more than 10 per cent above computed normal or fall lower than 5 per cent above the same base, which means that there was the most perfect balance in industry that has been achieved, and it is significant to add that the November figures showed business 7 per cent above normal.

KEEN COMPETITION EXPECTED

An outstanding prediction for 1927 is that heavy manufacturing will begin within the next 30 to 60 days, in which there is every reason to believe the manufacturers serving the electrical field will participate. The latest estimate of the three foremost manufacturers of electrical equipment indicates that the traction field will progress consistently. Reports from the Southeastern states are to the effect that there will be increasing demand for electric service. Keen competition is expected during the coming year, but it is thought that lower money rates, cheap, efficient transportation and an abundance of raw material will enable the manufacturers to face the situation.

While there is unrest in railroad and mining labor circles, mediation, it is believed, will prevent any serious conditions. As regards the latter situation, if the coming Miami conference should fail to establish a satisfactory wage, there still will be no chance of a coal shortage, as the extension of the non-union territory has brought about more rail outlets than in 1925, when the carriers estimated they could handle 8,000,000 tons of coal weekly. This figure is raised to 9,000,000 tons for 1927, contingent upon the men staying at work in the non-union territory. In all events, there is 85,000,000 tons above ground.

Turning to prophecies made during the last two weeks, one authority bases his bright outlook for 1927 upon the following factors:

1. The country's undiminished consuming power.
2. Growing evidence of new and highly conservative practices in trade.
3. Great productivity of the soil.
4. No political disturbance.
5. The condition in Europe. Rapid progress toward general restoration of sound character.

This same authority, however, suggests that the existence of prosperity does not prove the improbability of reaction; on the contrary, prosperity long continued may invite it. Experience is wholly against the perpetual continuance of interrupted trade activity.

Reports during the past two weeks reveal some interesting sidelights on raw materials used in the electrical industry. Copper prices, as a result of heavy world production and stock demand, are back to the low level of 1926. Lead and zinc are low, tin is slightly firmer. Rubber has encountered profit taking as the result of increase in stocks and because of small demand by manufacturing interests. Stock in London, as quoted Jan. 7, was 48,745 tons, compared with 43,332 tons in the previous week. President F. R. Henderson of the Rubber Exchange of New York attributes the strength of rubber to the technical position of the market rather than the artificial influence of the $40,000,000 American pool.

As far as it can be judged at this time, the crude oil situation is very favorable due to Nature having come to the relief of the oil supply last summer, with the result that there is now 765,000,000 barrels or more credited to the total of 1926.

According to W. C. Teagle, president of the Standard Oil Company of New Jersey, "the remarkable gain in production has been due mainly to the development of three major pools in the latter half of the year. These are Panhandle and Spindletop in Texas and Seminole in Oklahoma. How important they have been in effecting a change in the statistical position may be judged from the fact that they were doing 70,000 barrels a day on July 1 and by Thanksgiving were producing more than 367,000 barrels daily."

As far as steel is concerned, there are conflicting predictions for the next twelve months. A distinct increase in buying, however, marked the first week of January. This is attributed to the passing of the inventory date, rather than to any material change in consumptive requirements. The change is sufficient, it is thought, to make it certain that January steel production will materially exceed the December figure, reported as 347,200 tons, which represents an operating rate of about 75 per cent.

Additional $3,000,000 Asked for San Francisco Lines

Extensions of the Municipal Railway line to cost $3,000,000, in addition to extensions recommended several weeks ago and estimated to cost $3,500,000, were urged upon the public utility committee of the Board of Supervisors recently by various citizen committees, leagues and individuals.

The extensions requested were:

A crosstown line in the Sunset district; an extension from 24th and Church Streets over 24th, Conrad, Sussex and Elk Streets and along Sunnyside Heights; extension of the Potrero Avenue line over the Ocean Shore right-of-way to the southwestern corner of the city; extension of the Potrero Avenue line to 23d and Wisconsin Streets; extension of the same line through Bayview district; an extension through Moraga Street and also a new line following the general routes of Eureka and Diamond Streets.

International Steel Tie Books 50 Per Cent of Last Year's Orders

With only two weeks of the new year passed, International Steel Tie Company has booked business for 1927 equal to 50 per cent of last year's total, according to William P. Day, president. These bookings include ties for 23 miles of tie laying for the Kansas City Public Service Company. The order represents more than 20,000 ties and is part of the traction company's $6,600,000 rehabilitation program. President Day reports that orders for last year totaled 80,000 ties.

Rolling Stock

Chicago, Aurora & Elgin Railroad is rumored as about to place a large order for coaches. Since coming under the management of Samuel Insull and associates ten months ago, the company is said to have spent more than $1,000,000 in improving service.

Brooklyn-Manhattan Transit Corporation is considering the improvement of its rapid transit lines with 50 articulated cars, each of these 50 units to have three sections. The cars will be duplicates of the 67 units now on order, which were described in this paper in the issues from Sept. 19 to Dec. 26, 1925.

Tampa Electric Company, Tampa, Fla., has received ten new street cars from the American Car Company of St. Louis. The new equipment, which is of the Birney safety car type, has been placed in operation on the Belmont Heights line.

Track and Line

Dallas Railway, Dallas, Tex., has started work on the extension of the Oak Lawn line, which comes under Everman plan No. 4. This eight-block extension, which will cost $40,000, is expected to be in operation in two months.

United Railways, St. Louis, Mo., and the City of Maplewood, Mo., have been authorized by the Missouri Public Service Commission to construct a crossing over the tracks and right-of-way of the railway at Fork Avenue in Maplewood.

Georgia Railway & Power Company, Atlanta, Ga., plans to extend the carline on West Fair Street, a distance of about ½ mile. The extension is necessary, the petition sets out, to give service to the residents of a rapidly growing section.

Twin City Rapid Transit Company, Minneapolis, Minn., plans to spend $600,000 on railway extensions, bus lines and improvements in 1927, according to an estimate recently submitted to the Minneapolis City Council. Petitions and requests from various neighborhoods for street railway improvements have been submitted to the committee on street railways. One of the major projects is the connection of the Franklin Avenue line in Minneapolis with the Rondo-Maria line in St. Paul to provide another interurban line. Last year the company spent $650,000 on various improvements.

Trade Notes

H. C. Mode has been added to the railway division staff of the American Brown Boveri Electric Corporation at its Camden, N. J., plant. Mr. Mode is a graduate of Cornell and for the past twenty years has been connected with the Westinghouse Electric & Manufacturing Company in Pittsburgh and Philadelphia.

J. R. Thompson, formerly acting works manager of the Trafford Works of the Westinghouse Electric & Manufacturing Company, has been promoted to works manager of the same plant, according to announcement made recently by Vice-President H. C. Davis. The appointment is to take effect immediately.

National Railway Appliance Company of New York City and the Yellow Truck & Coach Manufacturing Company of Chicago announce their sales agreement as terminated effective Jan. 10. H. E. Listman, vice-president of the Yellow Manufacturing Sales Corporation, states that his firm is establishing a district sales organization in New York City, with offices at 33 West 42d Street. R. E. Fielder is being placed in direct charge of sales of what is to be known as the Eastern section, which includes all of New England, New York State, New Jersey and practically all territory east of Pittsburgh. Mr. Fielder is one of the pioneers in the bus field, having been identified with this industry almost twenty years. He first served as a designer for the London General Omnibus Company. Following this experience, he was chief designer of the bus division of the Daimler company for two years. He then became an associate of Colonel Greene in the service of the Fifth Avenue Coach Company, where he remained for fifteen years. For four years he was chief engineer for that company. Following this service Mr. Fielder went with the Yellow Coach Company of Chicago, where he had entire charge of the sales engineering division, training district sales representatives in transportation and engineering design. During the past two years Mr. Fielder has spent considerable time in Europe and Porto Rico making traffic surveys and engineering studies.

Archibald H. Ehle, formerly general domestic sales manager of the Baldwin Locomotive Works, Philadelphia, Pa., has been promoted to vice-president in charge of domestic sales. Mr. Ehle, after graduating from the Massachusetts Institute of Technology, joined the Baldwin forces as an apprentice in 1902, working for some time thereafter in the shops connected with the Highway Department. Later he was put in charge of the power house, from which post he went to the sales department in charge of locomotives. His appointment as general domestic sales manager followed this last period of service.

F. A. Estep has been elected chairman of the board of directors of the R. D. Nuttall Company, a subsidiary of the Westinghouse Electric & Manufacturing Company. Mr. Estep was president and treasurer of the company for years. Coincident with this promotion the duties of treasurer were added to those of Vice-President Ruppert.

Shops and Buildings

Brooklyn City Railroad, Brooklyn, N. Y., has a program for repair shop rehabilitation and re-equipment during 1927 which calls for an expenditure of approximately $500,000. Most of this sum will be spent at the 52d Street shops. This rehabilitation program for shops begun some year ago, and during 1926 the company renovated its Fresh Pond shops at a cost of about $100,000. The changes increased the capacity of the shops about 20 per cent, though enabling the company at the same time to reduce its working force by about fifteen men. The result was secured through introducing labor-saving machinery and otherwise improving the facilities for the maintenance of the rolling stock.

Portland Electric Power Company, Portland, Ore., is calling for bids for a garage to be built one block from the company's Hawthorne building on East Water Street. The structure will be of steel frame and will have 26,000 ft. of floor space. The building is for the purpose of storing all the regular equipment of the company's auto supplies in addition to 100 cars and buses. The cost of construction has been estimated by officials of the company at $45,000.

Toledo Traction Company, Toledo, Ohio, has acquired a new bus storage garage on Tracy Street near Oakdale Avenue. It was formerly the plant of the Automotive Tractor Company. In addition to the storage space for the 30 buses in service at Toledo the new garage has repair and supplies departments.

ELECTRIC RAILWAY MATERIAL PRICES—JAN. 11, 1927

Metals—New York

Copper, electrolytic, cents per lb.	13.025
Lead, cents per lb.	7.65
Nickel, cents per lb.	35.00
Zinc, cents per lb.	7.17
Tin, Straits, cents per lb.	66.75
Aluminum, 98 or 99 per cent, cents per lb.	27.00
Babbitt metal, warehouse, cents per lb.:	
Commercial grade	61.50
General service	32.50

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$5.275
Somerset mine run, Boston	2.575
Pittsburgh mine run, Pittsburgh	2.125
Franklin, Ill., screenings, Chicago	1.875
Central, Ill., screenings, Chicago	1.425
Kansas screenings, Kansas City	2.35

Track Materials—Pittsburgh

Standard steel rails, gross ton	$43.00
Railroad spikes, drive, $\frac{9}{16}$ in. and larger, cents per lb.	2.90
Tie plates (flat type), cents per lb.	2.35
Angle bars cents per lb	2.75
Rail bolts and nuts, cents per lb.	4.20
Steel bars, cents per lb.	2.00
Ties, white oak, Chicago, 6 in.x8 in.x8 ft.	$1.45

Hardware—Pittsburgh

Wire nails, base per keg	2.65
Sheet iron (24 gage), cents per lb.	2.90
Sheet iron, galvanized (24 gage), cents per lb.	3.75
Galvanised barbed wire, cents per lb.	3.35
Galvanised wire, ordinary, cents per lb.	2.50

Waste—New York

Waste, wool, cents per lb.	12–18
Waste, cotton (100 lb. bale), cents per lb.:	
White	13–17.50
Colored	10–14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), cents per lb.	10.07
White lead in oil (100 lb. keg), cents per lb.	14.50
Turpentine (bbl. lots), per gal.	$0.083
Putty, 100 lb. tins, cents per lb.	5.25–5.50

Wire—New York

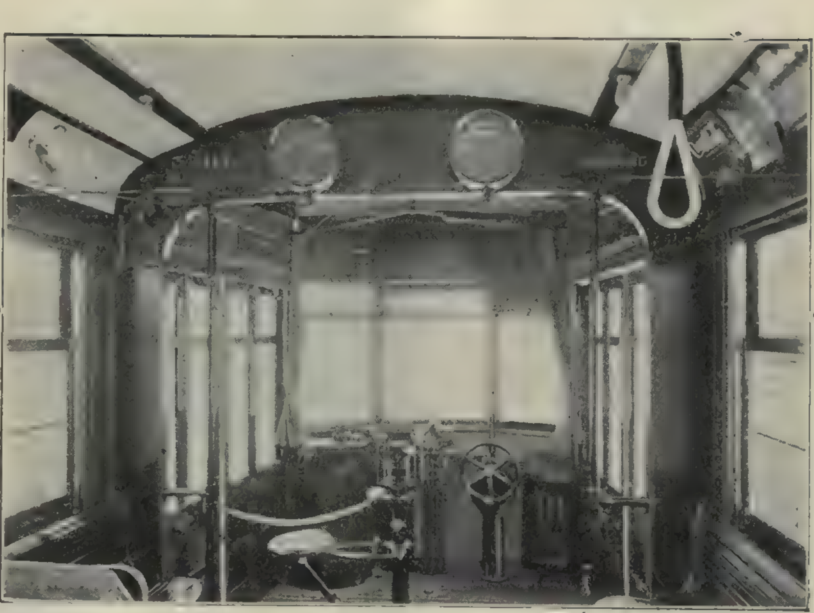
Copper wire, cents per lb.	15.25
Rubber-covered wire, No. 14, per 1,000 ft.	$5.50
Weatherproof wire base, cents per lb.	17.00

Paving Materials

Paving stone, granite, 5 in.	
New York—Grade 1, per thousand	$142.40
Wood block paving 3½, 16 lb. treatment, N. Y., per sq.yd.	$2.70
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	51.00
Paving brick 3x8½x4 N.Y., per 1,000 in carload lots	45.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.94
Cement, Chicago consumers' net prices, without bags	2.10
Gravel, ¾-in., cu.yd., f.o.b. N. Y.	1.75
Sand, cu.yd., f.o.b. N. Y.	1.00

Old Metals—New York and Chicago

Heavy copper, cents per lb.	10.375
Light copper, cents per lb.	9.00
Heavy brass, cents per lb.	6.625
Zinc, old scrap, cents per lb.	4.125
Lead, cents per lb. (heavy)	6.25
Steel car axles, Chicago, net ton	$17.75
Cast iron car wheels, Chicago, gross ton	15.50
Rails (short), Chicago, gross ton	16.75
Rails, (relaying), Chicago, gross ton (6 lb. and heavier)	28.50
Machine turnings, Chicago, gross ton.	6.75



What about platform space?

In the preparation of specifications for those new cars have you given just consideration to platform space? The equipment that will occupy a minimum of such valuable space?

If so, then you have included, as have nearly all modern car buyers,

"Peacock" Staffless Brakes

REG. U. S. PAT. OFF.

Modern cars are equipped with these brakes because they occupy less platform space and because of their well known braking power—three times that of the ordinary hand brake. With almost unlimited chain-winding capacity they are a guarantee of safety when emergency stops are necessary.

No matter what condition of brake rigging exists, any length of brake-chain can be handled—even up to 12 feet if necessary.

Write for performance facts and estimates.

National Brake Company, Inc.

890 Ellicott Square Buffalo, N. Y.

Canadian Representative: Lyman Tube & Supply Co., Ltd., Montreal, Can.

New Cincinnati busses ride on Generals

Tire which delivers the most miles, with the fewest interruptions, at the lowest possible cost per mile, chosen for 65 new busses of The Cincinnati Street Railway

When The Cincinnati Street Railway Company, of Cincinnati, Ohio, decided to operate a fleet of 65 motor coaches at Cincinnati, its officials profited by the experiences of large fleet operators from one end of the country to the other.

As a result, the many costly mistakes usually associated with a new enterprise were eliminated for this Cincinnati Company. On tires alone, for instance, its officials were able to make sure of the lowest possible cost per mile from the very beginning.

The Generals with which all 65 of these busses are equipped are designed and built to stand up and keep going in the steady day-in and day-out service every bus operator requires. They are built to provide maximum protection for the mechanism of the bus. Moreover, the lower rolling-resistance of The General Tire means a substantial yearly saving in power and gasoline consumption—an important item for the large bus fleet operator.

If these are the things you want on your busses, you want The General Tire. You want Generals because Generals will outtravel all competitors; because Generals bring you the lowest possible tire cost per mile; because when you standardize on Generals you make sure of the lowest possible cost of operation.

The Mark of Leading Tire Stores Everywhere

The

GENERAL TIRE

—goes a long way to make friends

BUILT IN AKRON, OHIO, BY THE GENERAL TIRE AND RUBBER CO.

Long Life—

An engine is no better than its crankshaft

A stiffer, steadier and longer-lived crankshaft is in the Mack engine

Crankshaft durability is more than strength. It calls for a hard bearing surface. It requires large bearing areas.

Ordinary heat-treatment makes small shafts strong. That is all. Sufficient case hardening for durability cannot be had without making the entire shaft too brittle to stand the shocks.

Small shafts lack rigidity and bearing area.

Mack shafts are big enough to be stiff as well as strong. Stiffness permits case-hardening. This means glass-hard journals of large area with a soft, tough core.

Integral forged counterweights permit vibrationless dynamic balance.

The Waterloo, Cedar Falls & Northern Railway Company
of Waterloo, Iowa, supplement their traction
service with Mack Buses

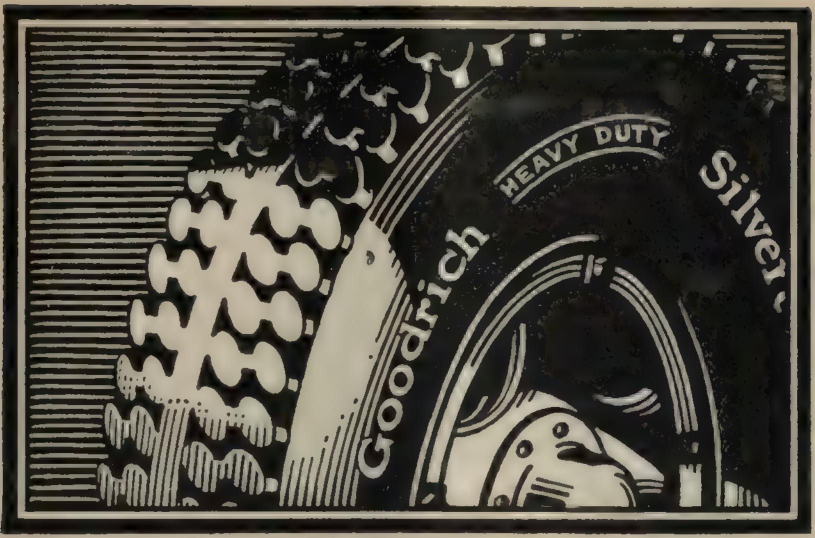
Long Life Pays—

Consistently, The Waterloo, Cedar Falls & Northern Railway Company have purchased Macks because Macks have given them consistent service.

Over four years ago—in 1922—they bought their first Macks—and they have repeated since. They haven't even considered replacements yet. Not only because the Macks are in good condition, but because over this period they have been economical. They have stayed on the road and they are not being everlastingly tinkered with to be kept going.

The Waterloo organization can tell you what it means to use a dependable bus, with long life and freedom from trouble. And they will tell you that you can get it by using Macks.

Mack Trucks, Inc.
International Motor Company
25 Broadway, New York City



Bringing down bus operating costs!

With buses running hundreds of miles per day, a small difference in tire design can quickly grow into a big effect on costs and profits.

In many cases, changing to Goodrich has improved gasoline mileage. Again, Goodrich Silvertown cushioning has made maintenance costs go down. By reducing the number of interruptions to service, Silvertowns have brought tremendous savings to users. And back of it all is the cost per tire mile—on which the Goodrich average is most attractively low.

Goodrich

HEAVY DUTY Silvertowns

Super-dimensions—special rubber compound. Extra tough, heavy duty, anti-skid tread. Sidewalls, same stock as tread and heavily re-inforced. A pneumatic tire especially designed by the makers of the first cord tire in America—for bus, truck and heavy duty service.

THE B. F. GOODRICH RUBBER CO., Akron, Ohio

Keep the wheels turning

When your buses are making miles they are making money. When vibration and road shock crystallize a battery connector so that it breaks off, it costs you money. We had this in mind when we designed the Willard Bus Battery.

T.A. Willard

Note how the Willard Bus Battery is made with flexible lead-coated connectors between cells. These absorb the vibration and protect you against expense and delay.

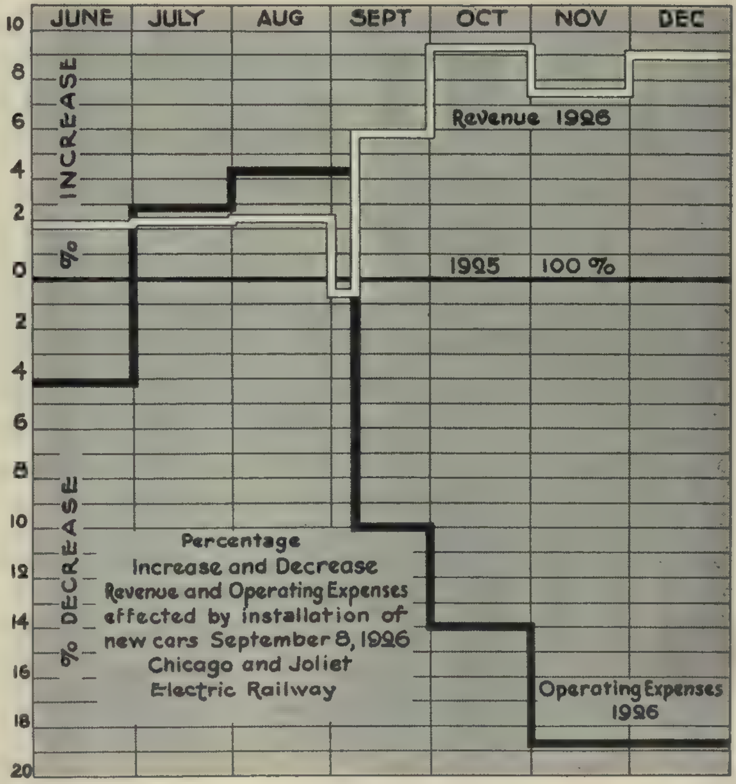
WILLARD STORAGE BATTERY COMPANY
CLEVELAND, OHIO

Willard Batteries

Immediate Response to New Type Cars

CHICAGO & JOLIET ELECTRIC RAILWAY COMPANY placed in service last summer 10 modern cars combining in unusual degree, comfort and attractive appearance. The response of the public by increased riding was immediate as shown by the accompanying chart. You will note the chart shows a decided increase in revenue and decrease in operating expenses from the date the new cars were placed in service, September 8th. The actual increase to December 31st has averaged 4.21 cents per car mile. Operating expenses show a gradual decrease due to operating the cars with two men during September and part of October while the men were breaking in for one man operation. The average decrease in expenses for November and December was 5 cents per car mile, due to one man operation and saving in maintenance and power. The net increase in earnings for the last two months therefore amounts to 9.21 cents per car mile.

UNQUESTIONABLY MODERN CARS PAY



We will be glad to furnish specifications and any information desired on these cars

CUMMINGS CAR AND COACH COMPANY

Successor to McGuire Cummings Mfg. Co.
111 W. Monroe Street
CHICAGO

Why we make two grades of Electric Car Oil

WE manufacture two grades of Texaco Electric Car Oil—one for summer and one for winter use. There is a good reason for this.

Temperature statistics in many cities show that the average temperature for the month of January is about 30° F., and for the summer about 74° F.—a difference of about 44°. In some cities the variation is greater.

Consequently we make a summer and a winter grade of car oil. In manufacturing them, this seasonal temperature difference is taken into account and the oils differ from each other in viscosity sufficiently to compensate for this; so that in use outdoors, **in season,** they will both have approximately the same viscosity.

As both oils are admirably suited for the work from the standpoint of lubricating quality, it is readily seen that by changing seasonally you will come pretty close to getting identical lubricating conditions throughout the year.

Texaco Electric Car Oils are carefully refined pure mineral oils. They do not decompose, become rancid, or give off disagreeable odors under any kind of working conditions. They do not cause a glazing of the waste. Being homogeneous, they feed evenly and steadily. They are being used with great success in various parts of the country.

There is a Texaco Lubricant for Every Purpose

TEXACO

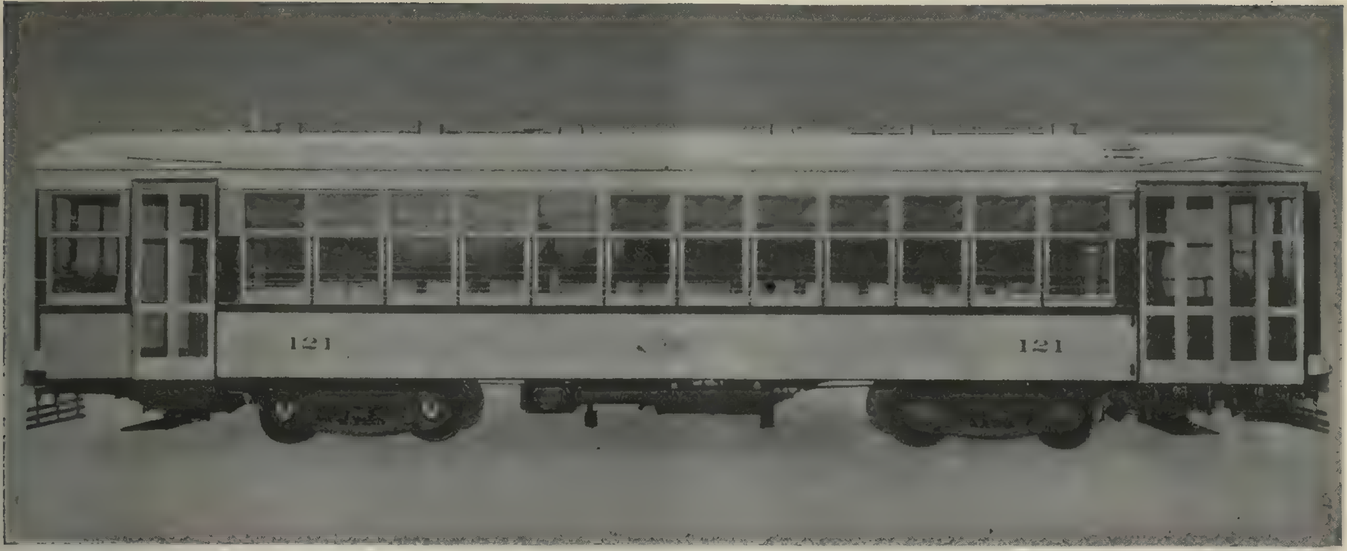
THE TEXAS COMPANY

DEPT. R.J. 17 BATTERY PLACE . NEW YORK CITY

HOUSTON - CHICAGO - NEW YORK

OFFICES IN PRINCIPAL CITIES

TEXACO



In the designing of the St. Louis EIB trucks, small number of parts, concentration on balance, lightness, and quiet, smooth operation with adequate strength has produced a combination of these qualities decidedly in advance of previous attainments in street railway operation, and resulting in improved riding qualities.

Muskegon's new cars are "Quality Cars" indeed

Unusually Attractive Cars Recently Shipped to Michigan Railway

THE public of Muskegon, Michigan, will find it hard indeed to resist the appeal of the new cars recently shipped to that city from the "Quality Shops" of the St. Louis Car Co. Built for double end, one-man operation, the smaller doors are arranged as exits, and can be equipped with step treadles if desired. St. Louis Car Co. R50 reversible spring rattan seats, accommodating forty-eight passengers, contribute to an attractive interior.

Painting is a feature. Side panels of fawn grey, trimming in red, with blue upper sash, and white dashes make a strikingly unusual and pleasing appearance. Experience on this line shows the effectiveness of the white dash in attracting attention, and gaining a clear track. Cars are 44 ft. 10 in. long over bumpers, 29 ft. 9 in. over body corner posts, mounted on St. Louis EIB-58 trucks with quadruple 25-hp. motors and weigh, complete, 32,000 lbs. Safety Devices are equipped.

St. Louis built "Quality Cars" meet the demands of a discriminating Public—for further particulars, write—

St. Louis Car Company
St. Louis, Mo.
"The Birthplace of the Safety Car"

The Question of Trade

IN SELECTING oils and greases for your machinery, care should be taken to choose those which are best suited to the machinery in your plant. Lubricants should be selected according to the work they will have to do and the wear they will have to endure, just as the manufacturer of a machine uses steel in one place, cast iron in another and bronze in still another.

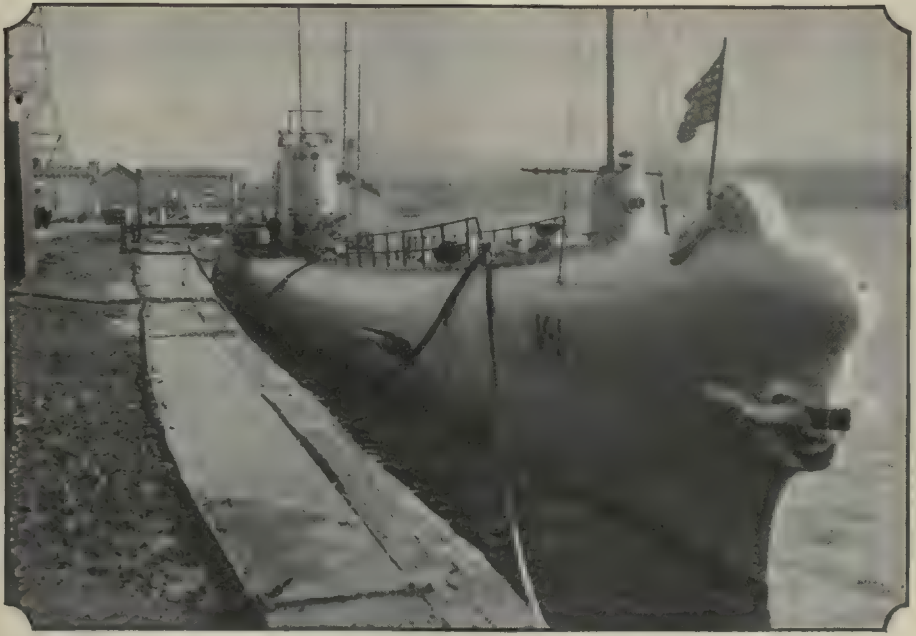
Lubricants should not be chosen from the standpoint of viscosity alone. The suitability of the oil or grease to the running speed of the machine, the bearing pressure, and the heat under which the machine operates must also be considered. In some cases, where the lubricants are exposed to acid or salt water, special care must be taken to select oils or greases which will resist the action of these agents.

Standard Oils and Greases

are made in a wide variety of grades to meet the requirements of all machinery now used in the industrial world. For your own protection, it is advisable for you to have the aid of the Standard Oil Company (Indiana) representative, who is competent to tell you which grades will give the best results under the conditions present in your plant.

STANDARD OIL COMPANY
(INDIANA)
910 South Michigan Avenue Chicago, Illinois

Asbestos Ebony



Down in the sea in ships

WHEN the U. S. Submarine V-1 dives undersea, seven officers and eighty men stake their lives on her equipment.

So the best materials are chosen, including electrical mountings of Johns-Manville Asbestos Ebony.

The choice was the result of exhaustive tests by the Navy Department Bureau of Engineering. Asbestos Ebony was the only switchboard material of reasonable price that passed the shock tests. And it showed a higher dielectric strength and insulation resistance than quarried materials.

Manufactured, not quarried, Asbestos Ebony has no flaws or metallic veins. It is made in flat sheets and moulded shapes for everything from central station switchboards to fuse blocks.

JOHNS-MANVILLE CORP., 292 Madison Avenue at 41st Street, New York City
Branches in all large cities. For Canada: Canadian Johns-Manville Co., Ltd., Toronto

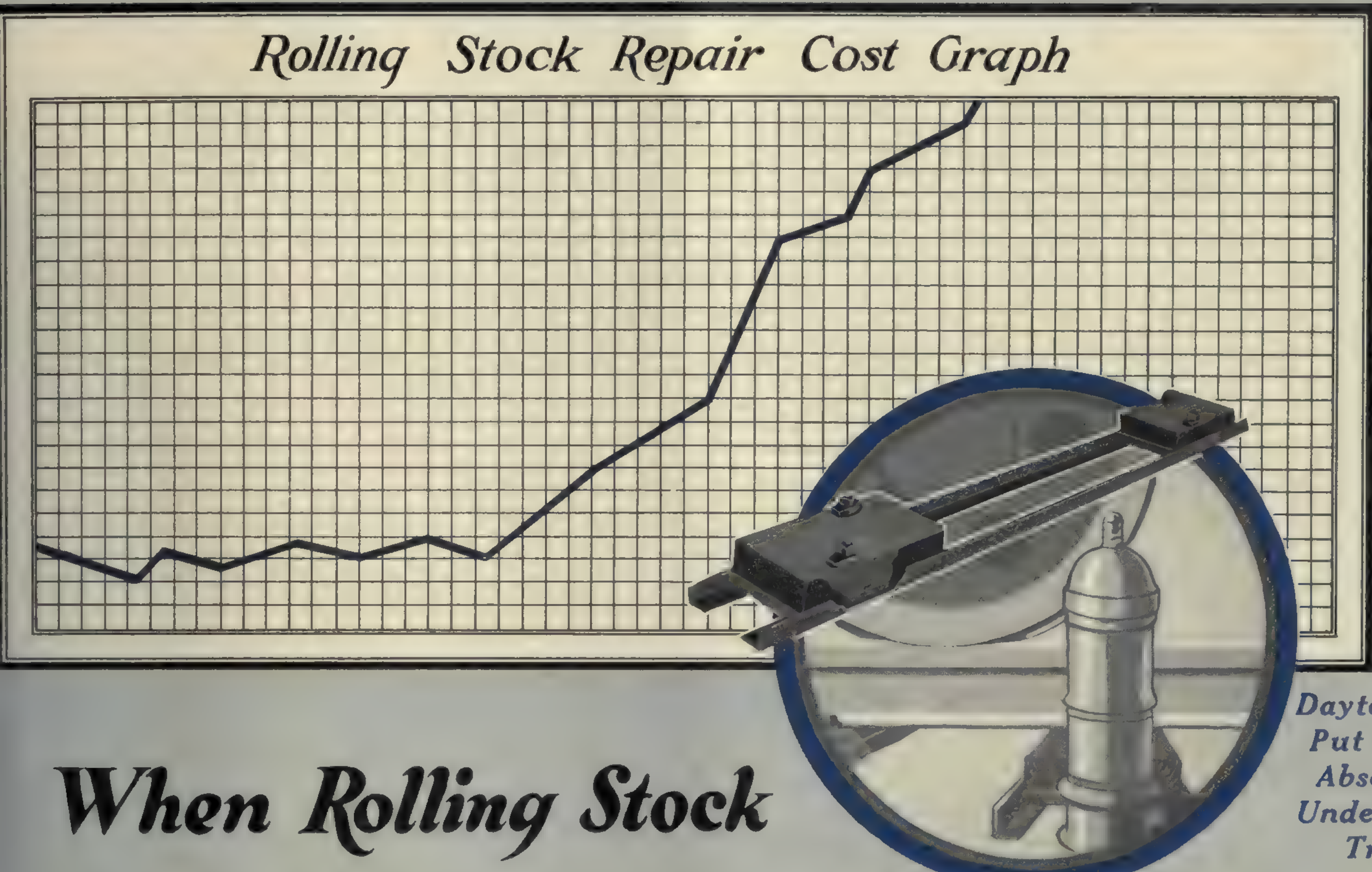
JOHNS-MANVILLE

Electrical Materials
FOR
Utilities
Jobber
Contractor
AND
Dealer

An increasingly large portion of the actual income derived from car card advertising service must be devoted to building and maintaining the prestige of car card advertising in the face of the active competition of all other media.

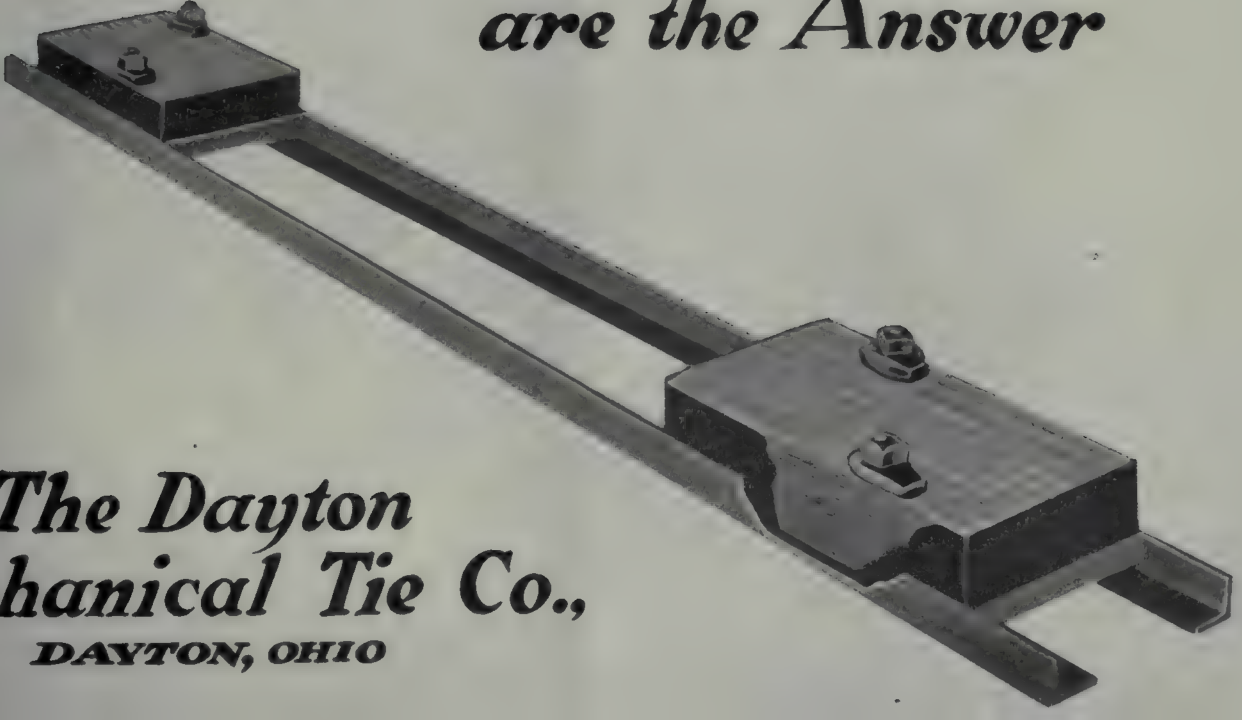
Creating and protecting our mutual interest is a costly item.

Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK



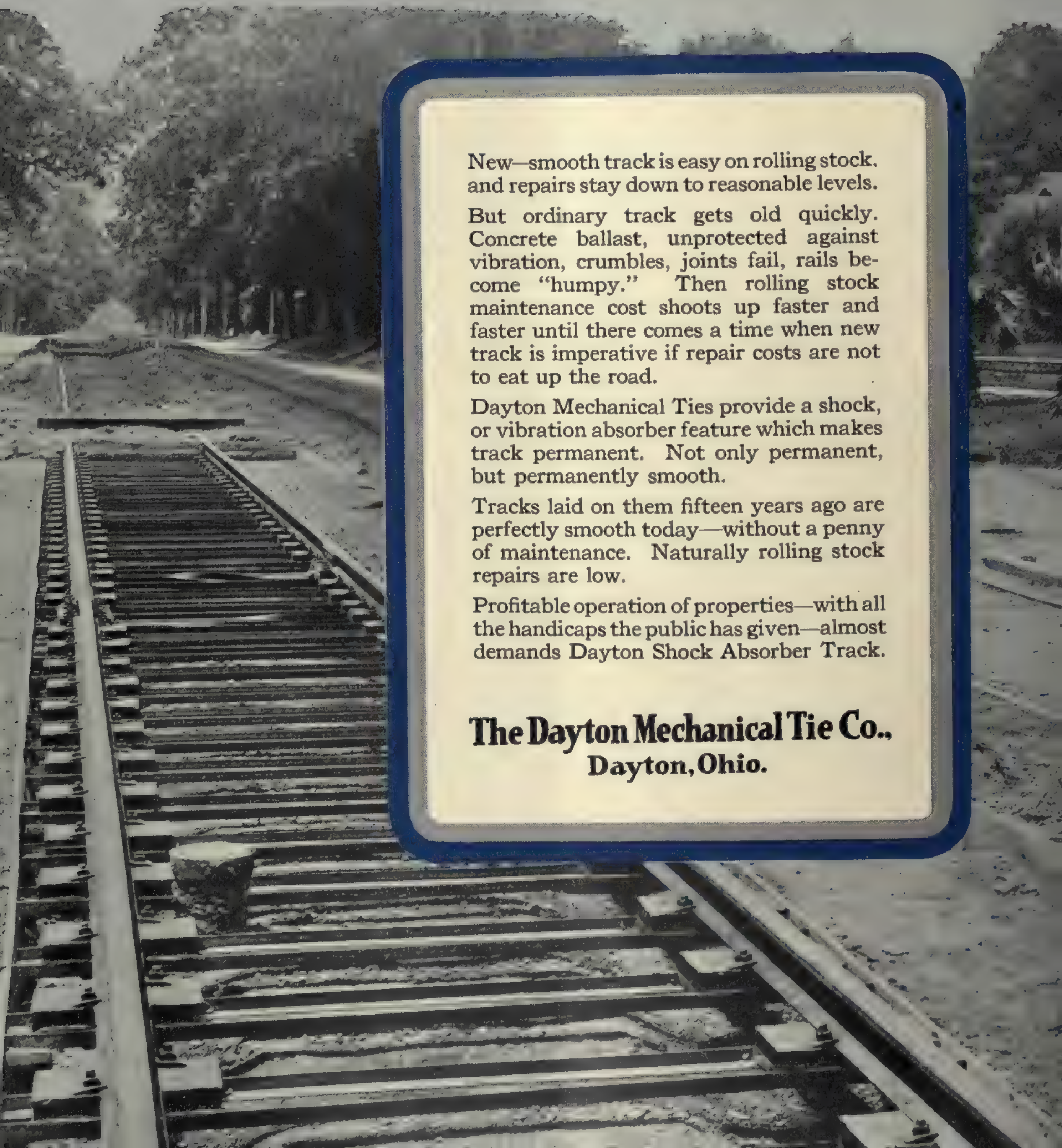
Dayton T
Put Sho
Absorbe
Under Yo
Track

When Rolling Stock
Repairs Jump—
Dayton Ties
are the Answer



The Dayton
lechanical Tie Co.,
DAYTON, OHIO

Permanently Smooth Track, Which Slashes Rolling Stock Repairs, is Accomplished Fact Through Dayton Mechanical Ties.



New—smooth track is easy on rolling stock, and repairs stay down to reasonable levels.

But ordinary track gets old quickly. Concrete ballast, unprotected against vibration, crumbles, joints fail, rails become "humpy." Then rolling stock maintenance cost shoots up faster and faster until there comes a time when new track is imperative if repair costs are not to eat up the road.

Dayton Mechanical Ties provide a shock, or vibration absorber feature which makes track permanent. Not only permanent, but permanently smooth.

Tracks laid on them fifteen years ago are perfectly smooth today—without a penny of maintenance. Naturally rolling stock repairs are low.

Profitable operation of properties—with all the handicaps the public has given—almost demands Dayton Shock Absorber Track.

The Dayton Mechanical Tie Co.,
Dayton, Ohio.

EVERY *International* pole bears the stamp of approval of this company in the form of the *International* dating nail. This nail demonstrates our willingness to stand solidly behind our poles and assures the purchaser that he receives sound timber, careful manufacture, strict inspection, thorough treatment; in other words, an A-1 pole.

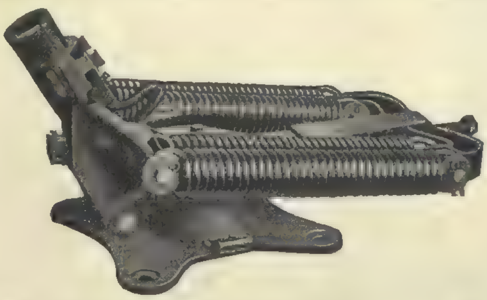
Long life, reliable service and the economies of Creosoted Pine lines can be obtained only in fullest measure by the exclusive use of sound pine poles free from decay, carefully seasoned and pressure treated full length with high grade creosote oil. *International* poles fulfill every requirement of quality. They have been time tested by more than 28 years of service with less than 1% of renewals and are in use from coast to coast.

Illustration shows International poles in service of the Eastern Texas Electric Company (Stone & Webster)

International Creosoting & Construction Co.
Galveston—Texarkana—Beaumont

International
Creosoted Yellow Pine Poles

Do You Think You Could Build a Nuttall Trolley?



You doubtless could if you knew what grade of metal to put in the foot, the swivel, the pole socket, etc.—if you knew where they had to be reinforced to withstand strains and where they had to be lightened to keep down weight; if you knew a reliable foundry that could furnish suitable castings; if you had $60,000 worth of special machinery, tools, jigs, reamers, drills, etc., but even so, if you didn't have 35 years of experience and a crew of skilled mechanics you couldn't *equal* a Nuttall Trolley. So why should you think anyone else could?

Why should you buy just trolley poles, trolley harps, trolley wheels? If they cost less than Nuttall's its poor economy anyhow because they are worth less. And it is worth something *more* to get with your purchase the feeling of confidence inspired by a product you know is *right*.

Buy genuine Nuttall Trolley parts, poles, wheels, harps, from Nuttall.

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

BUDA
ESTABLISHED
1881

For the Best in Track Work

Forty-five years experience and the best of modern facilities.

Send Us Your Inquiries

THE BUDA CO.
Harvey, Ill.

7 Reasons Why

you will want to see this pay-raising set

New Form

The Library of Electrical Maintenance and Repair—in its new form—contains Annett & Roe's CONNECTING AND TESTING D.C. MACHINES and the new second edition of Dudley's CONNECTING INDUCTION MOTORS.

1. The five books in this library discuss actual repair jobs and show you step by step what to do when anything goes wrong.
2. They show you how to locate and remedy motor and generator troubles.
3. They show you how to reconnect motors to meet any condition of voltage, phase, frequency and speed.
4. They give you suggestions for preventing electrical machinery troubles.
5. They cover fully the rewinding of motors.
6. They present information that will help you get better service out of your electrical equipment.
7. They give you tables, data, kinks and diagrams that you will find of priceless value every day on every job.

See It Free

Free examination—no money down—only $2.00 in ten days and $2.00 a month until paid.

Fill in and mail the coupon attached and we will send you the entire set of five volumes for ten days' Free Examination. We take all the risk—pay all charges. You assume no obligation—you pay nothing unless you decide to keep the books. Then $2.00 in ten days and the balance at the rate of $2.00 a month. Send the coupon NOW and see the books for yourself.

McGRAW=HILL
FREE EXAMINATION COUPON

McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York.

Gentlemen:—Send me the LIBRARY OF ELECTRICAL MAINTENANCE AND REPAIR all charges prepaid for 10 days' Free Examination. If satisfactory I will send $2.00 in ten days and $2.00 a month until $14.00 has been paid. If not wanted I will write for shipping instructions.

Name ....
Home Address ....
City and State ....
Firm or Employer...
Occupation ....E. 1-15-27

HASKELITE

11

electric railway companies ordered HASKELITE and PLYMETL for car repair work in a month

IN ADDITION to their wide application in modern new light weight cars, HASKELITE and PLYMETL are being regularly used to improve old equipment. The current order list shows eleven companies scattered over seven states who bought for repair work in about a month. This is not unusual. There is a constantly increasing volume of such business.

May we send you a list of operators and builders using HASKELITE and PLYMETL to cut weight, increase strength and improve appearance of electric railway equipment, both old and new?

HASKELITE MANUFACTURING CORPORATION
133 West Washington Street, Chicago
CANADIAN REPRESENTATIVES:
Railway and Power Engineering Corporation, Ltd
Montreal Toronto Winnipeg

PLYMETL

ERJ1-15Gray

PANTASOTE

Trade Mark

Seat and Curtain Materials

There is no substitute for Pantasote

AGASOTE

Trade Mark

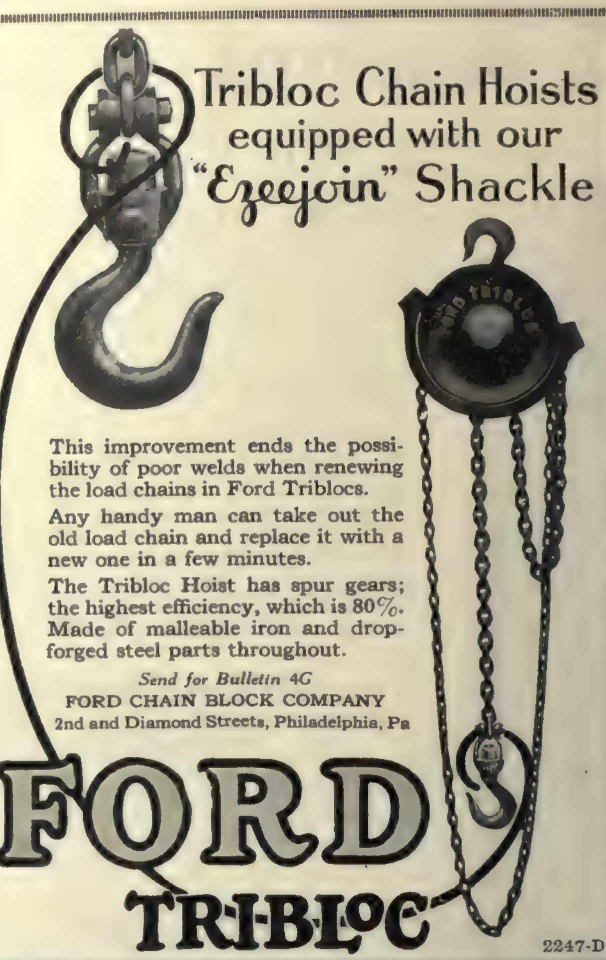
Roofing—Headlining—Wainscoting

The only homogeneous panel board

*standard
for electric railway cars
and motor buses*

The PANTASOTE COMPANY Inc.
At 46th Street 250 Park Avenue
NEW YORK
Pantasote Products for Both ELECTRIC RAILWAYS AND BUSES

Tribloc Chain Hoists equipped with our "Ezeejoin" Shackle



This improvement ends the possibility of poor welds when renewing the load chains in Ford Triblocs.

Any handy man can take out the old load chain and replace it with a new one in a few minutes.

The Tribloc Hoist has spur gears; the highest efficiency, which is 80%. Made of malleable iron and drop-forged steel parts throughout.

Send for Bulletin 4G

FORD CHAIN BLOCK COMPANY
2nd and Diamond Streets, Philadelphia, Pa

2247-D

*Change a wheel? Change a harp?
Change a pole?*

Simple.!
BAYONET TROLLEY HARP CO.

*Base, pole, harp and wheels
—perfectly co-ordinated*

It's just that easy for any of your men to change trolley wheels on a car fitted with Bayonet Detachable Trolley Harps, or to change poles on a car fitted with Bayonet Trolley Bases and Detachable Pole Clamps. Either operation becomes a matter of seconds only. No tools required. No wasted time or delayed service.

Also Bayonet Special Trolley Wheels and Sleet Cutters.

Write us.

Bayonet Detachable
Trolley Equipment

BAYONET TROLLEY HARP CO.
SPRINGFIELD, OHIO

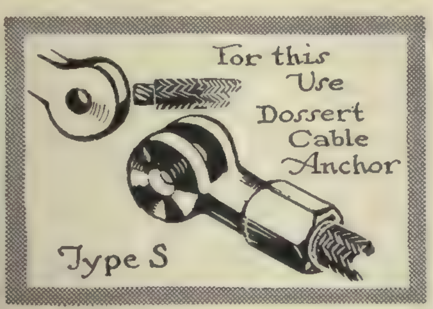
ELECTRICAL INSULATION

PERFECT MICANITE INSULATOR REG. U.S. PAT. OFF. and PERFECT EMPIRE INSULATOR REG. U.S. PAT. OFF.

- Micanite and Super-Micanite Sheets, Commutator Segments, and Commutator Rings
- Micanite Tubes and Washers
- Linotape, Seamless or Sewn Bias *(Yellow or Black Varnished Tapes)*
- Empire Oiled Cloths and Papers *(Yellow or Black)*
- Compounds, Varnishes, Etc.

Send for catalog and helpful booklet on Commutator Insulation and Assembly

MICA INSULATOR COMPANY
Largest manufacturers in the world of mica insulation.
Established 1893
New York: 68 Church St. Chicago: 542 So. Dearborn St.
Cleveland Pittsburgh Cincinnati
San Francisco Los Angeles Seattle
Works; Schenectady, New York; Victoriaville, Canada; London, England


For this Use Dossert Cable Anchor
Type S

DOSSERT
Cable Anchor

—another service best made by the Dossert Tapered Sleeve principle of solderless connection.

See the Dossert 20th Year Book for various connectors that save time and improve the job.

Write for Your Copy

GET THIS BOOK

FREE

Dossert & Co.
242 West 41st Street
New York, N. Y.

Where performance counts

use
Le Carbone Carbon Brushes

They talk for themselves

W. J. Jeandron
Hoboken Factory Terminal,
Building F, Fifteenth Street, Hoboken, N. J.
Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street
Canadian Distributors: Lyman Tube & Supply Co., Ltd.
Montreal and Toronto

Cold Dinners
for *your* passengers?

Not if you use

AJAX
BABBITT *for* ARMATURES

keeps the rolling stock rolling

The Ajax Metal Company
Established 1880
PHILADELPHIA
NEW YORK CHICAGO BOSTON CLEVELAND

CARNEGIE
The name to look for on Steel

Structural Shapes · Steel Sheet Piling
Plates · Skelp
Bars and Bar Mill Products
Bands · Hoops
Axles · Wrought Steel Wheels
Rails · Rail Joints
Steel Cross Ties

CARNEGIE STEEL COMPANY
General Offices · Carnegie Building · 434 Fifth Avenue
PITTSBURGH PENNSYLVANIA

1839

B. A. HEGEMAN, Jr., President H. A. HEGEMAN, First Vice-Pres. and Treas.
F. T. SARGENT, Secretary W. C. PETERS, Vice-Pres. Sales and Engineering

National Railway Appliance Co.

Grand Central Terminal, 452 Lexington Ave., Cor. 45th St., New York

BRANCH OFFICES

Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago, Ill.

RAILWAY SUPPLIES

- Tool Steel Gears and Pinions
- Anglo-American Varnish Co., Varnishes, Enamels, etc.
- National Hand Holds
- Genesco Paint Oils
- Dunham Hopper Door Device
- Garland Ventilators
- Walter Tractor Snow Plows
- Ft. Pitt Spring & Mfg. Co., Springs
- Flaxlinum Insulation
- Anderson Slack Adjusters
- Economy Electric Devices Co., Power Saving and Inspection Meters
- Yellow Coach Mfg. Company—Single and Double-deck Buses

Feasible Drop Brake Staffs

Tisco Manganese Steel in trackwork, introduced by Wharton in 1894, is still the superior metal for long life under severest railway service.

WILLIAM WHARTON JR. & CO., Inc.
Easton, Penna.

Bethlehem Products for Electric Railways

Tee and Girder Rails; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Alloy Steel Crossings; Abbott and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates and Pole Line Material.

Catalog Sent on Request

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

BETHLEHEM

REDUCE OVERHEAD BY EQUIPPING WITH
THORNTON
Side Bearing
TROLLEY WHEELS

The practical bearing of long life and endurance.

The logevity of our wheels is not due to hard metal which is destructive to the overhead but rather to the extensive bearing surface and improved method of lubrication. The bearing improves with use and many still in service have covered 100,000 miles.

Write for references

THORNTON TROLLEY WHEEL CO., Inc.
ASHLAND, KENTUCKY

Lorain Special Trackwork
Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY
Johnstown, Pa.

Sales Offices:
Atlanta Chicago Cleveland New York
Philadelphia Pittsburgh Dallas

Pacific Coast Representative:
United States Steel Products Company
Los Angeles Portland San Francisco Seattle

Export Representative:
United States Steel Products Company, New York, N. Y.

Hubbard and COMPANY
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The Hardware makes the line
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"IRVINGTON"

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Irvington Varnish & Insulator Co.
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Years can be added to the life of any iron pole which has become corroded at the ground level with our REINFORCING CLAMPS, or added height may be obtained by using the EXTENSION CLAMPS.

ALSO MOUNTS FOR WOOD POLES.

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886 Main St., Bridgeport, Conn.
Represented in Canada by the Canadian Line Materials, Ltd., Toronto, Ont.

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WE MANUFACTURE various types of trolley equipment. The quality of metal, conductivity, resistance to friction, effect on overhead, shape and size of wheel groove, have all been carefully worked out and perfected. In addition to the highly specialized V-K Oilless Trolley Wheels and Harps, More-Jones make the most complete line of lubricated trolley wheels and harps to meet all requirements. Let us quote you.

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Drip Points for Added Efficiency

They prevent creeping moisture and quickly drain the petticoat in wet weather, keeping the inner area dry.

The Above Insulator—No. 72—Voltages—Test—Dry 64,000 Wet 31,400, Line 10,000.

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Operating perfectly and requiring minimum attention for maintenance and lubrication, Earll Catchers and Retrievers give genuinely satisfactory results. Their refinement of design, and mechanical superiority are summarized in the following five features, peculiar to Earll construction.

No-wear Check Pawl
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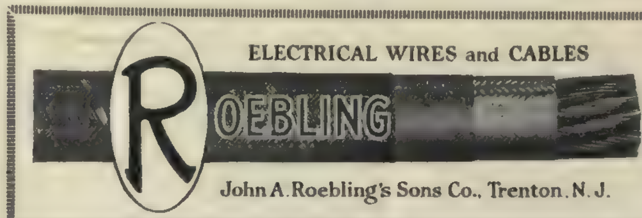

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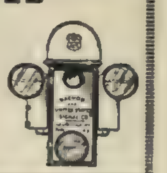

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is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.
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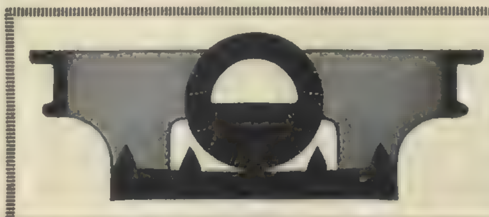

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Let us tell you of this especially designed box for this class of service.

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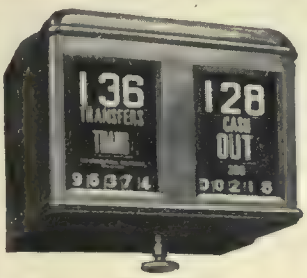
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"FOR SALE" announcements are carefully read by the trade.

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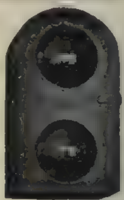

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10 Practically new specially constructed

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Wgt. 10-ton, type of motor 2 GE 247-A, double doors, equipped for double end operation and all safety devices.

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Specialists in street cars or any part of a street car.

Illustrated bulletin supplied on request.

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All in first class operating condition

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1—Commutator for Rotary Converter (New).

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Peekskill Lighting & Railroad Co.

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2—Modern Rotary Converters—In Ohio

G. E. HCC, 600 volts D.C., 300 kw., 1200 r.p.m., Form P, 60 cycle, 3 phase, switchboard, outdoor transformers, 13200 volts primary, switching equipment. IN EXCELLENT OPERATING CONDITION.

Full details will be furnished promptly.

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is frequently the difference between having good needed equipment or doing without it.

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Brill Built

West. 508 or G. E. 264 Motors

Cars Complete—Low Price—Fine Condition

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A question of unusual interest to the executives of all electric railways, particularly Purchasing Agents and Storekeepers.

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Bethlehem Steel Co.
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Ajax Metal Co.
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(Continued on page 50)

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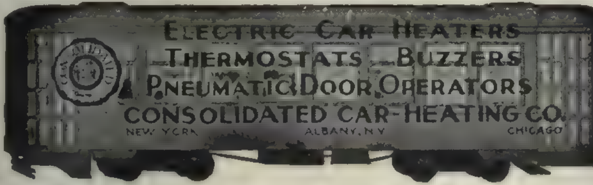

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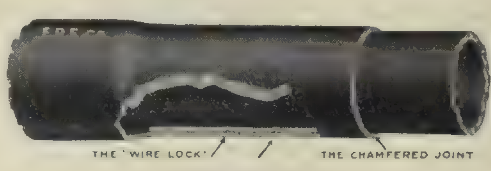

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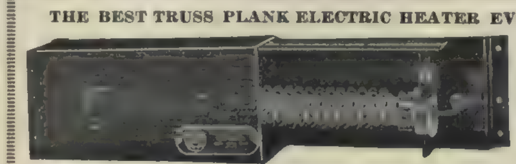

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ALPHABETICAL INDEX TO ADVERTISEMENTS

Page
Ajax Metal Co., The.......... 44
American Brass Co., The...... 46
American Brown Boveri Electric Corp. 14-15
American Car Co.............. 53
American Electrical Works.... 46
American Insulating Mach. Co.. 46
American Steel Foundries 6
American Steel & Wire Co..... 42
Anaconda Copper Mining Co... 46
Archbold-Brady Co............ 45

Babcock & Wilcox Co.......... 45
Bayonet Trolley Harp Co...... 40
Beeler Organization, The...... 44
Bemis Car Truck Co........... 51
Bethlehem Steel Co........... 42
Bibbins, J. Rowland 44
Bridgeport Brass Co.......... 16
Brill Co., The J. G........... 53
Buchanan & Layng Corporation. 44
Buda Co., The................. 38

Cameron Electric Mfg. Co...... 45
Carnegie Steel Co............. 41
Chillingworth Mfg. Co......... 51
Cincinnati Car & Coach Co...18-19
Clark-Williams Engineering Co.. 43
Cleveland Fare Box Co., The... 46
Cole, A. B.................... 45
Collier, Inc., Barron G....... 34
Consolidated Car Fender Co., The 52
Consolidated Car Heating Co.... 51
Cummings Car & Coach Co.... 29

Day & Zimmermann, Inc....... 44
Dayton Mech. Tie Co...Insert 35-36
Dayton Covington & Piqua Traction Co................... 47

Page
Differential Steel Car Co., The.. 51
Dossert & Co. 41
Drum & Co., A. L............ 45
Duff Mfg. Co., The.......... 45

Earll, C. I.................. 43
Electric Equipment Co........ 47
Electric Railway Equipment Co. 51
Electric Service Supplies Co.... 7

Ford, Bacon & Davis, Inc...... 40
Ford Chain Block Co.......... 40
"For Sale" Ads............... 47

General Electric Co..20, Back Cover
General Tire & Rubber Co., The. 22
Gold Car Heating & Ltg. Co.... 51
Goodrich Rubber Co........... 27

Hale-Kilburn Co.............. 10
Haskelite Mfg. Corp.......... 39
"Help Wanted" Ads............ 47
Hemingray Glass Co........... 43
Hemphill & Wells 44
Holst, Englehardt W.......... 44
Hubbard & Co................. 42

Ingersoll-Rand Co............ 49
International Creosoting & Constr. Co. 37
International Motor Co..Insert 23-26
International Oxygen Co....... 45
International Register Co...... 46
International Steel Tie Co., Front Cover
Irvington Varnish & Insulator Co. 42

Page
Jackson, Walter 44
Jeandron, W. J.............. 41
Johns-Manville Corp......... 33

Kelker, DeLeuw & Co......... 44
Kelly Cooke & Co............ 44
Kessler, Wirt 47
Kuhlman Car Co.............. 53

Le Carbone Co............... 41
Lorain Steel Co., The........ 42

McClellan & Junkersfeld 44
McGraw-Hill Book Co., Inc..... 39
Mack Trucks, Inc......Insert 23-26
Metal & Thermit Corp......... 17
Mica Insulator Co............ 40
More-Jones Brass & Metal Co... 43

Nachod and United States Signal Co., Inc.................... 45
National Brake Co., Inc....... 21
National Pneumatic Co........ 13
National Railway Appliance Co. 42
Naugle Pole & Tie Co......... 46
Nuttall Co., R. D............ 38

Ohio Brass Co................ 5
Okonite-Callender Cable Co., Inc., The 46
Okonite Co., The............. 46

Pantasote Co., Inc., The...... 40
Peekskill Lighting & Railroad Co. 47
Perey Mfg. Co., Inc.......... 51
Positions Wanted and Vacant.. 47

Railway Track-work Co........ 4
Railway Utility Co........... 52

Page
Ramapo-Ajax Corp............ 51
Richey, Albert S............. 44
Roebling's Sons Co., John A... 45
Rome Wire Co........Insert 11-12
Russell-Robinson, T.......... 47

St. Louis Car Co............. 31
Safety Car Devices Co........ 8
Samson Cordage Works........ 46
Sanderson & Porter.......... 44
Searchlight Section 47
Smith Heater Co., Peter...... 45
Standard Oil Co............. 32
Star Brass Works............ 51
Stevens & Wood, Inc......... 44
Stone & Webster, Inc........ 44
Stucki Co., A............... 45

Texas Co., The.............. 30
Thornton Trolley Wheel Co.... 42

Una Welding & Bonding Co.... 45
Universal Lubricating Co...... 51

Van Loan Corp., Irving S...... 47

"Want" Ads.................. 47
Wason Mfg. Co............... 53
Westinghouse Electric & Mfg. Co. 2
Westinghouse Traction Brake Co. 9
Wharton, Jr. & Co., Wm....... 42
"What and Where to Buy", 48, 50, 52
White Engineering Corp., J. G.. 44
Williard Storage Battery Co.... 28
Wish Service, The P. Edw..... 45
Wood Co., Chas. N............ 46

WHAT AND WHERE TO BUY—Continued from page 50

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail Special Track Work
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co. Inc.

Telephones and Parts
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Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)
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Ties, Wood Cross (See Poles, Ties, Posts, etc.)
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General Tire & Rubber Co.
Goodrich Rubber Co., B. F.
Tongue Switches
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St. Louis Car Co.
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Ohio Brass Co.
Trolley Bases, Retrieving
General Electric Co.
More-Jones Brass & Metal Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Ohio Brass Co.
Trolley Buses
Brill Co., The J. G.
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Miller Trolley Shoe Co.
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More-Jones Brass & Metal Co.
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Trolley Wire
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Vol. 69
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Pages 151-190

CONTENTS

JANUARY 22, 1927

Editorials 151

Billion Dollar Plan for Chicago Transit 154

Henry A. Blair, president Chicago Surface Lines, presents a plan to develop the three present systems of surface cars, elevated and buses. Unified company proposed with terminable permit franchise. Report contains estimated budget of expenditures in three steps extending to 1950 and presents estimated earnings at an average fare of 7.35 cents.

Chicago Rapid Transit Takes Leading Part in First-Aid Campaign 156

Increasing Car Speeds and Rush-Hour Carrying Capacity 157

BY PAUL MARIAGE.

A discussion of various factors which enter into these two matters, with particular reference to electric railway and bus operation in Paris.

An Added Source of Revenue 161

BY F. W. BROWN.

Electric railways may provide an attractive express service in conjunction with their normal freight movements.

Old Passenger Cars Rebuilt for Freight Trailers 162

The "Texas Idea" in Street Car Publicity 163

BY E. J. MUSE.

El Paso cars are being dressed up to attract increased patronage. Exterior and interior decoration is part of program. Use of "different" car cards helps both advertisers and railway.

Boston "L" Issues New Guide Book 165

High-Speed Articulated Cars for W., B. & A. 165

Ten two-car body units, each mounted on three trucks, will supply limited service between Washington and Baltimore. Easy riding qualities and superior appointments.

Cab-Controlled Coupler Speeds Up San Diego Service 167

BY R. G. AVERILL.

High-speed multiple-unit trains at San Diego demonstrate merits of combination air and electric car coupler in heavy interurban service, where speed in coupling and uncoupling is essential.

Railways in Indiana Operate 278 Buses 169

Bucket Seats Prove Popular 170

Losses from Congestion Decreased 170

Open Secrets of Operation in St. Louis 171

The Readers' Forum 171

Maintenance Notes 172

Association News and Discussions 175

News of the Industry 177

Recent Bus Developments 182

Financial and Corporate 184

Personal Mention 186

Manufactures and the Markets 188

Pacing the Industry

THE thoughts of one man are the seeds from which spring the achievements of another. For centuries these seeds were unfruitful because there was no adequate method for sowing them. Then came John Gutenberg with his printing press, and soon the first harvest was reaped. Gradually, man discovered that there were no limitations to the interchange of thought; that a multiplicity of achievements would result from the grouping of ideas. This led him to specialization. Then came the enormous strides of science. Every invention required a medium to exploit its claims and expand its usefulness, and thus arose the necessity for technical publications.

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Advertising Index—Alphabetical, 36; Classified, 32, 34, 36; Searchlight Section, 31

The residential limited

Back from the tracks lies virgin territory as far as trolley invasion is concerned—and consciously so. The inhabitants of these semi-rural sections seek not the inconvenience, but the quietude, although inconvenience is theirs. The ordinary public conveyance is, through its disturbing element, most unwelcome.

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WESTINGHOUSE TRACTION BRAKE COMPANY
Automotive Division, Wilmerding, Pa.

6163

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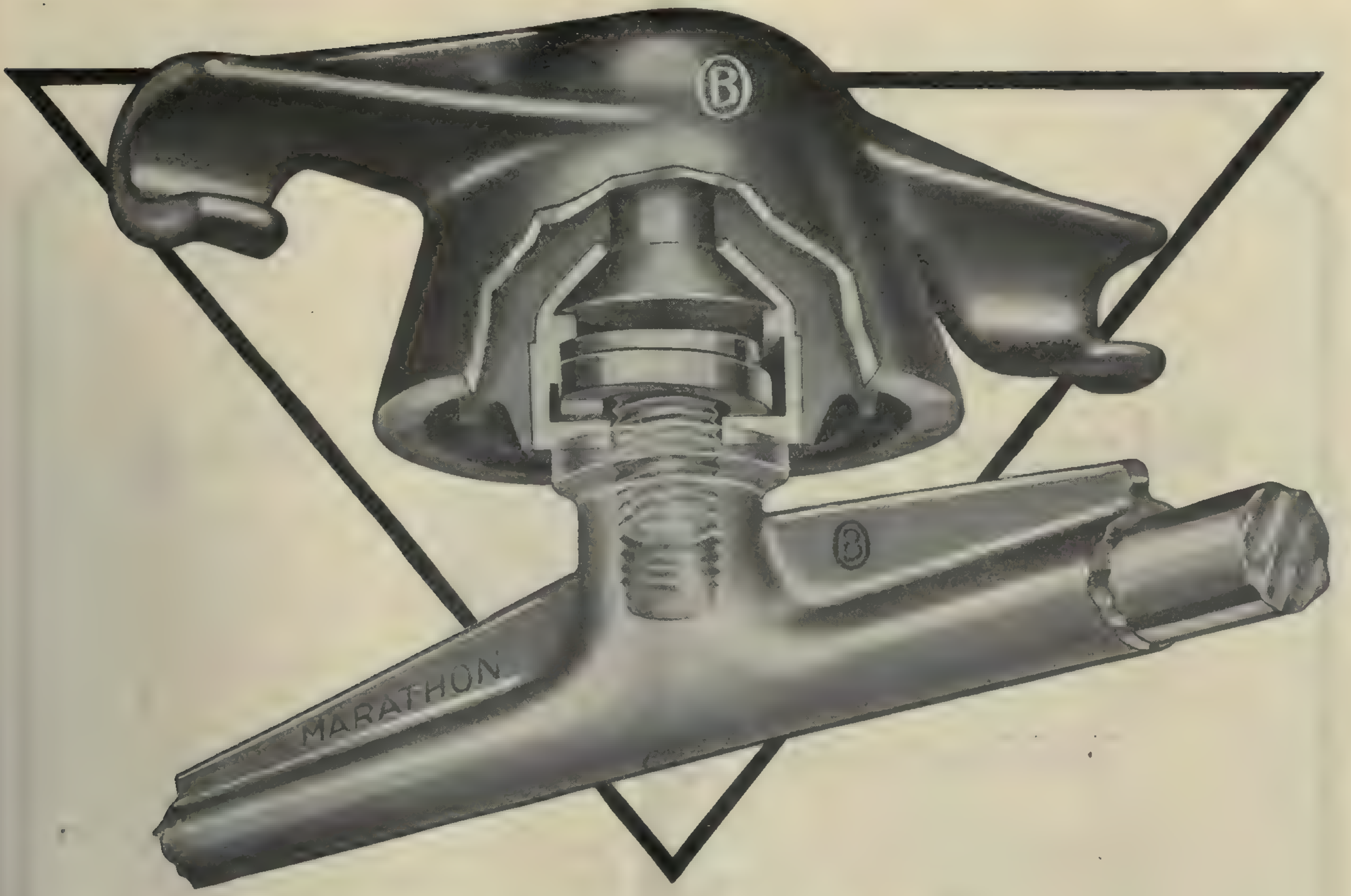
AUTOMOTIVE AIR BRAKES



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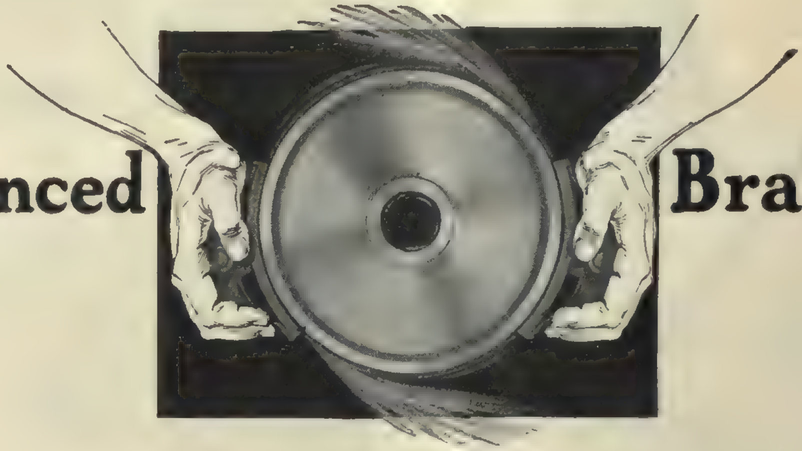

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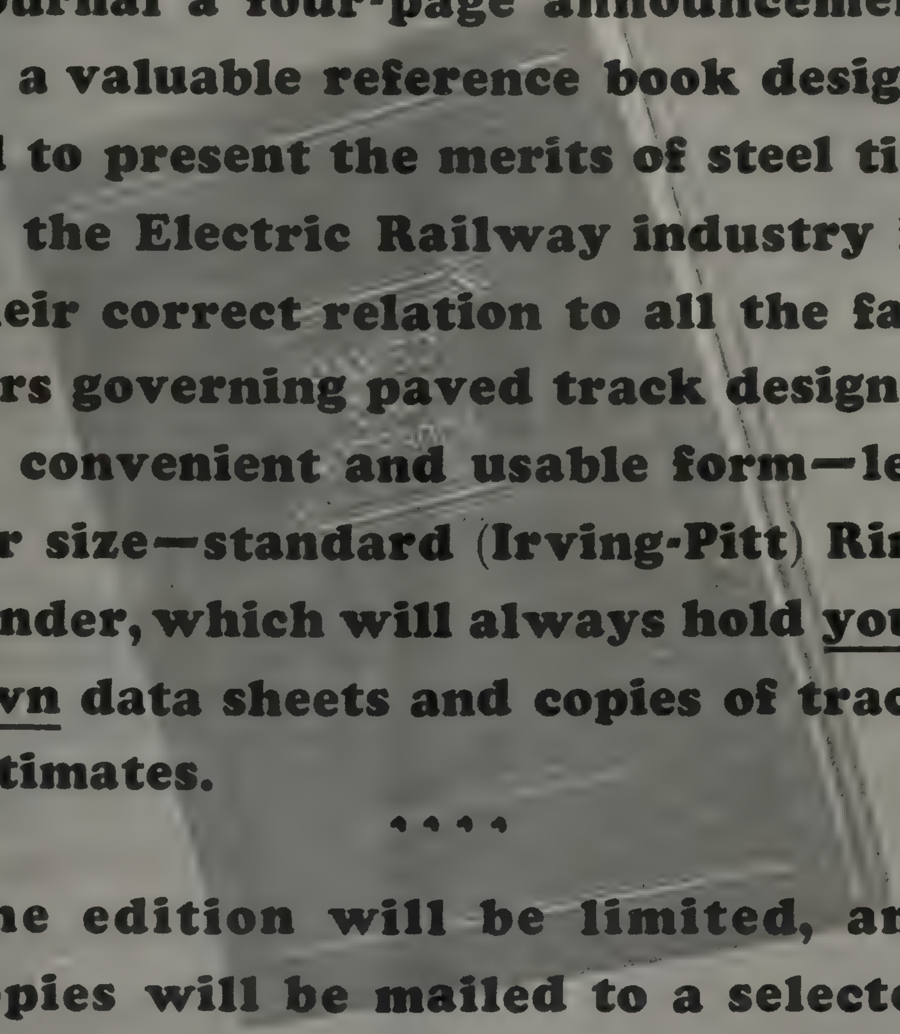

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* * *

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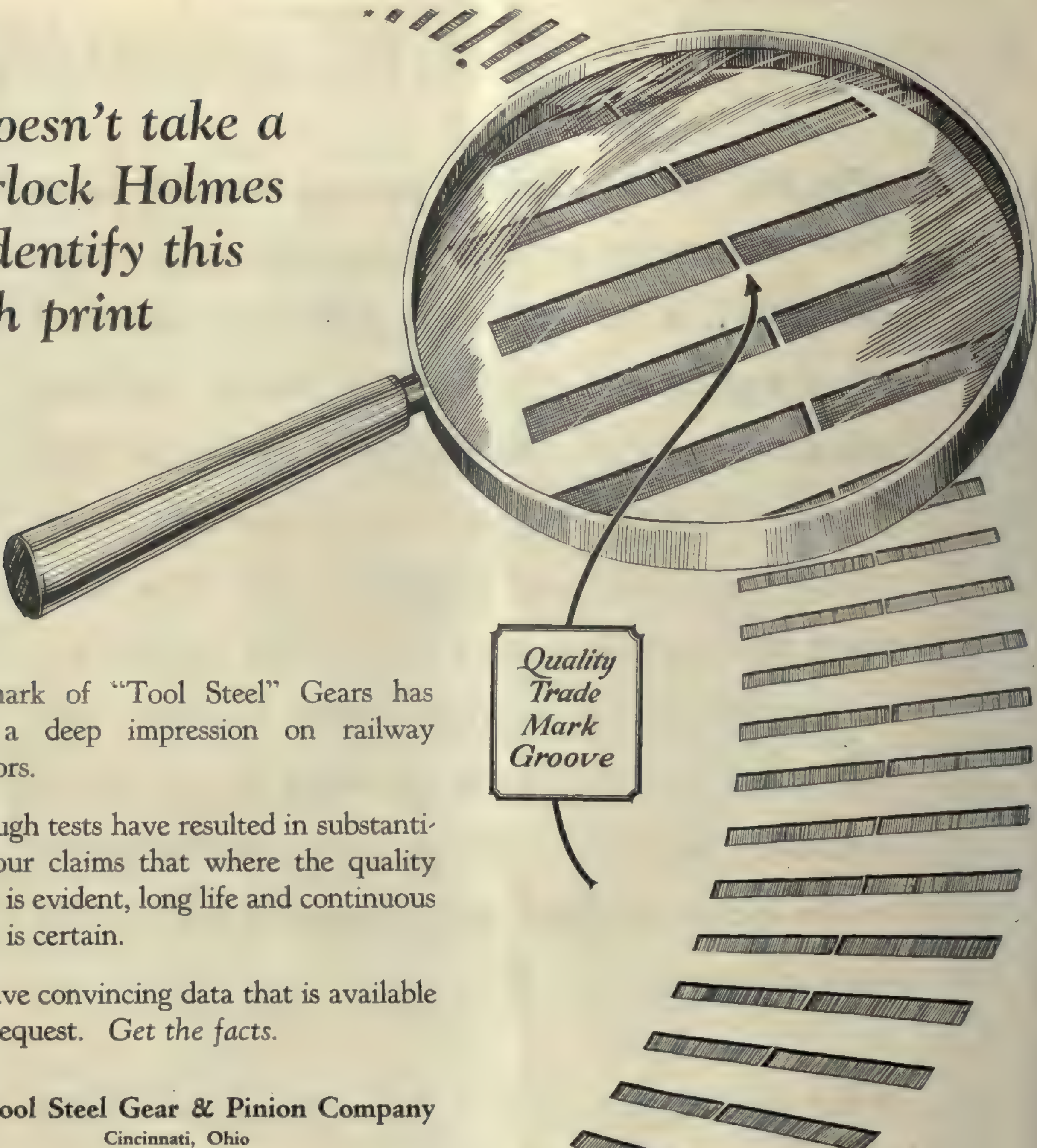

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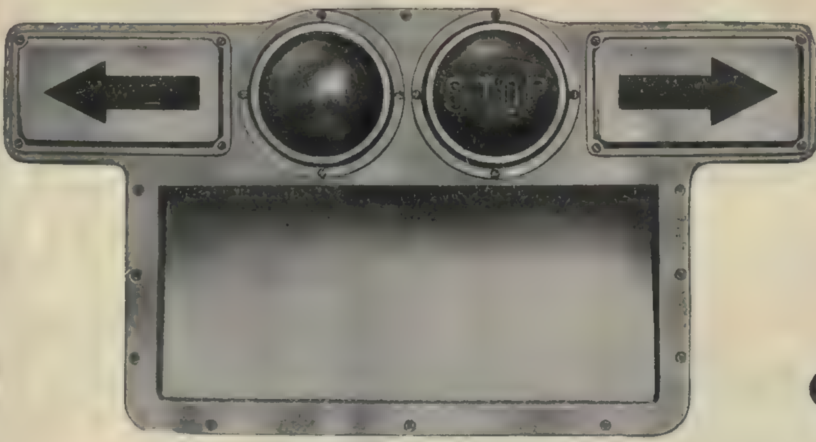

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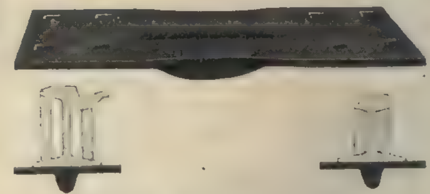

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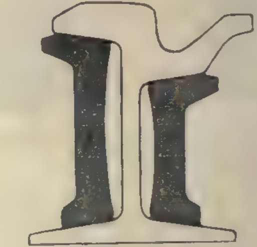

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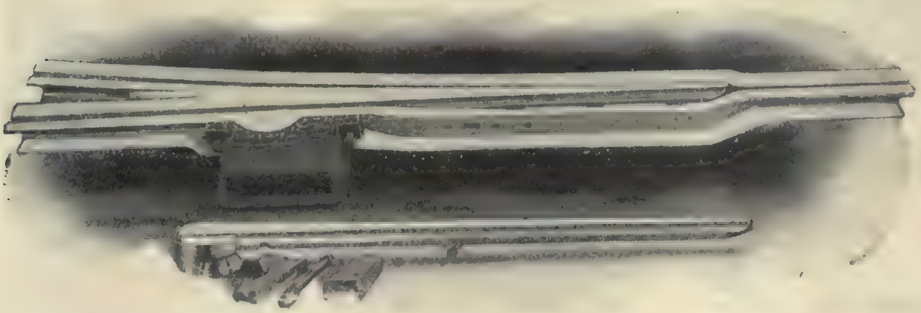

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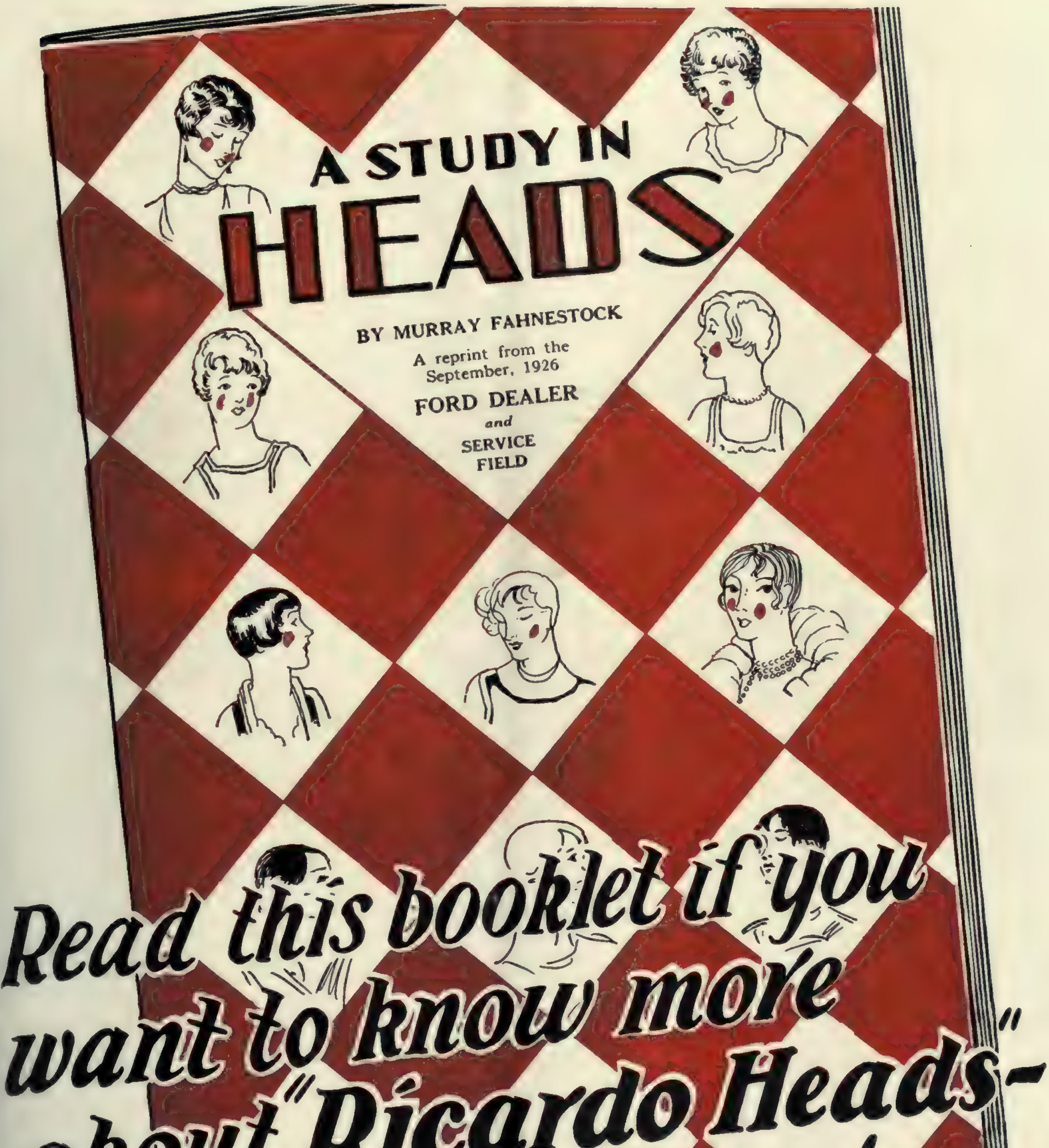

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BY MURRAY FAHNESTOCK

A reprint from the
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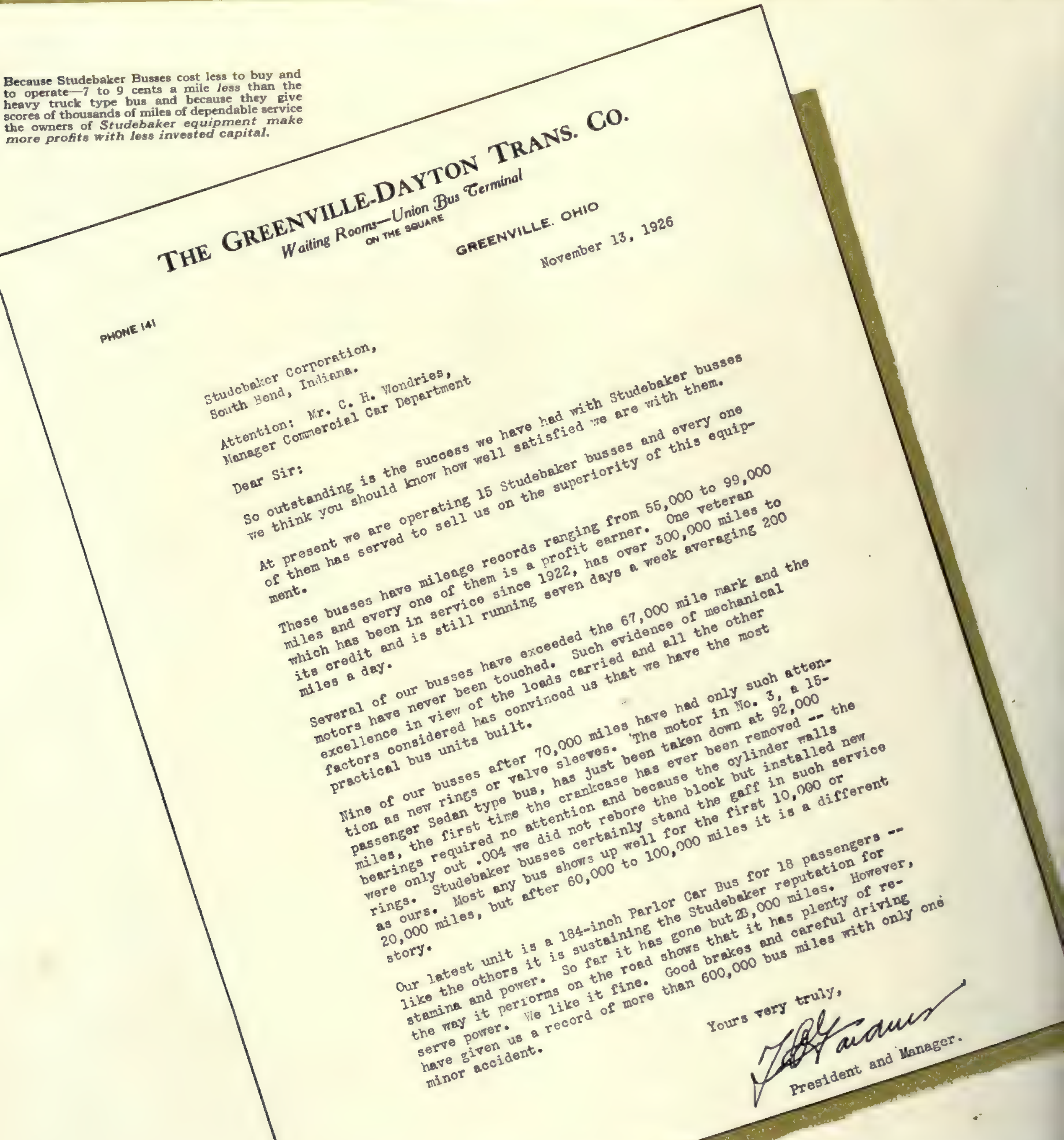

THE GREENVILLE-DAYTON TRANS. CO.
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November 13, 1926

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So outstanding is the success we have had with Studebaker busses we think you should know how well satisfied we are with them.

At present we are operating 15 Studebaker busses and every one of them has served to sell us on the superiority of this equipment.

These busses have mileage records ranging from 55,000 to 99,000 miles and every one of them is a profit earner. One veteran which has been in service since 1922, has over 300,000 miles to its credit and is still running seven days a week averaging 200 miles a day.

Several of our busses have exceeded the 67,000 mile mark and the motors have never been touched. Such evidence of mechanical excellence in view of the loads carried and all the other factors considered has convinced us that we have the most practical bus units built.

Nine of our busses after 70,000 miles have had only such attention as new rings or valve sleeves. The motor in No. 3, a 15-passenger Sedan type bus, has just been taken down at 92,000 miles, the first time the crankcase has ever been removed -- the bearings required no attention and because the cylinder walls were only out .004 we did not rebore the block but installed new rings. Studebaker busses certainly stand the gaff in such service as ours. Most any bus shows up well for the first 10,000 or 20,000 miles, but after 60,000 to 100,000 miles it is a different story.

Our latest unit is a 184-inch Parlor Car Bus for 18 passengers -- like the others it is sustaining the Studebaker reputation for stamina and power. So far it has gone but 23,000 miles. However, the way it performs on the road shows that it has plenty of reserve power. We like it fine. Good brakes and careful driving have given us a record of more than 600,000 bus miles with only one minor accident.

Yours very truly,

President and Manager.

Studebaker Busses' low first cost does not sign
that the essential qualities of stamina and lo
life are in any way sacrificed as the above let
from an experienced operator attests.

with LESS CAPITAL

The Studebaker Parlor Car De Luxe, price $6150, f. o. b. factory—one of the 15 Studebaker busses operated by The Greenville-Dayton Trans. Co., Greenville, O.

The Bus Operator's Dollar goes further with Studebaker Equipment

ACCORDING to the horsepower ratings of the Society of Automotive Engineers, the Studebaker bus chassis is the most powerful bus chassis of its size and weight in the world.

The Studebaker 75 H.P. engine is velvet smooth in its operation even under a heavy load. Vibration is practically eliminated by the use of a fully machined crankshaft—an item of manufacturing which costs Studebaker over $600,000 a year extra to insure accurately balanced motors.

The Studebaker Parlor Car De Luxe

For inter-city and suburban service the Studebaker 20-passenger Parlor Car De Luxe Bus (illustrated) is an deal unit providing rapid, luxurious transportation. Mounted on the Studebaker bus chassis of 184-inch wheelbase, the body complete in its appointments offers a degree of luxury and comfort comparable only to busses selling for 10,000 and up—yet its price is only $6150, complete.

ndividual arm chairs upholstered in genuine leather—ample leg room nd a broad center aisle—wide windows with double drapes—mirrors et into the window posts—six dome lights and excellent heating and ventilating systems are some of the features that combine to create an atmosphere of comfort and refinement.

Lower
—first cost
—operating cost
—maintenance cost
—depreciation cost

Complete Equipment

There is nothing to buy but the license. Standard equipment includes: rear traffic signal light system; illuminated destination sign at the front; concealed door control at driver's right; front and rear bumpers; automatic windshield cleaner and rear vision mirror; motometer with lock; extra wheel, tire, tube and carrier mounted on the left front fender; front and rear corner lights; inspection lamp. Two beam acorn headlights are controlled from the steering wheel. All instruments including an 8-day clock are grouped under a glass oval and indirectly lighted.

Most Economical to Operate

Lower first cost, plus its longer life, guarantees the lower depreciation cost of the Studebaker chassis. This saving together with lower operating expense assures the Studebaker operator of *more profit per passenger mile.*

ix Body Designs, 12 to 21 Passengers, $3935 to $6150

rices f. o. b. factory, covering body and chassis, complete. Purchase can be arranged on a liberal Budget Payment Plan—Small down payment and balance in convenient monthly installments.

2-Pass. (including driver) cross-seat Sedan-Type	$3935
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9-Pass. (including driver) cross-seat Sedan-Type	$5050
1-Pass. Pay-As-You-Enter Street-Car Type*	$5125
3-Pass. (including driver) side-entrance Parlor Car	$5300
0-Pass. (including driver) Parlor-Car De Luxe*	$6150

*Includes dual rear wheels

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We have................................busses at present.

Check below the Studebaker Bus about which you desire information.

Type: Sedan..........Parlor Car..........Street-Car Type..........

Capacity:...........................Passengers.

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Absolute precision decreases the power load, whether industrial or automotive. Ahlberg precision is checked down to one-ten-thousandth of an inch.

Sixteen years devoted exclusively to the study and betterment of ball bearings have resulted in a superior knowledge of bearing requirements as well as a superior manufactured product. In the Ahlberg plant, no detail tending toward perfection is too trivial to be overlooked or neglected.

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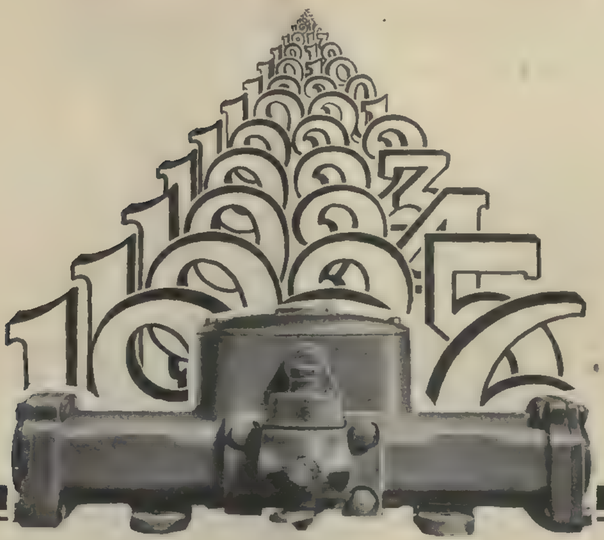

The Years Behind Your Door and Step Mechanisms

IF an engineer set out today to develop door and step equipment, he probably would think of many parts which later might turn out to be both non-essential and contributory to trouble and expense in upkeep. It is only through years of intensive study and experience that National Pneumatic Door Engines and Controlling Mechanisms have been simplified to their present practical basis.

The area and arrangement of the valves with liberal bearing surfaces for long-time wear — the perfected system of lubrication—the carefully calculated door cushioning action — these and many other details could not have been attained in the original design. It is the years *behind* your door and step controlling mechanisms which have made them so dependable and inexpensive to maintain.

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ONCE a car is set in motion, the safety of passengers and equipment largely depends on the brake shoes. Brake shoes are the final link—the culminating point—in the entire chain of safety devices. Should this last link fail to function properly, all other precautions may go for naught. American Brake Shoes are built not only to function efficiently but to *retain* full braking efficiency under all conditions of service and through all stages of wear.

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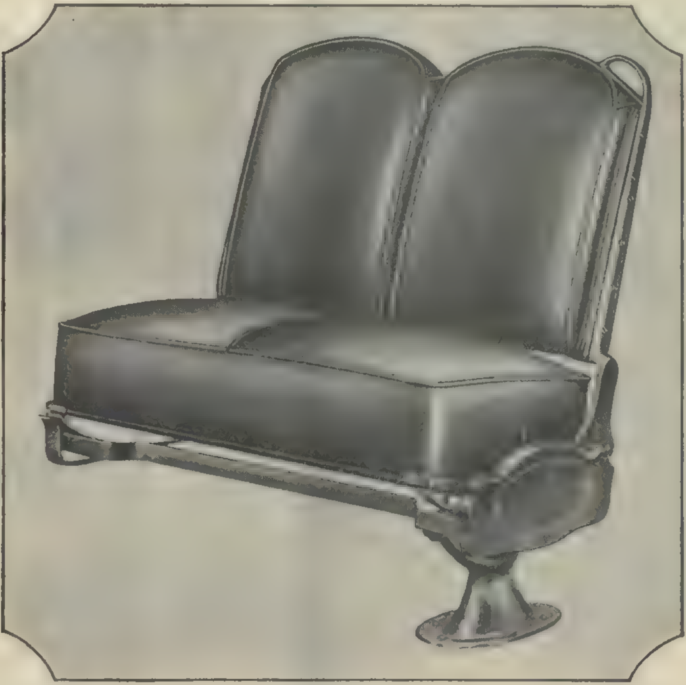

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THIS Heywood-Wakefield seat is designed for the modern type of interurban service where comfort is now so important. It has been selected for both new cars and for replacement use.

It has deep, double spring cushions shaped to allow more leg freedom. Mechanism rails are set in. The individual backs are properly pitched for comfort.

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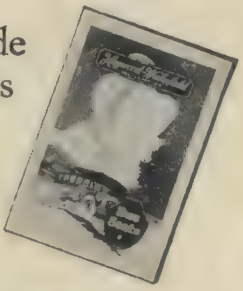

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Indiana Truck Corporation
has standardized on Shuler Fronts for all their models

Shuler
Front Axles

For: TRUCKS, MOTOR BUSSES, TAXIS
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Incorporated
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CURVED SIDE CONSTRUCTION

This important feature of
BALANCED DESIGN
has done three things
for Cincinnati New Cars

It has added an attractive, distinctive and "speedy" line to the exterior appearance of Cincinnati New Cars.

It has permitted approximately seven and one-half inches additional space for seats and aisles, with ample roof and wagon clearance to meet all operating conditions.

And it has resulted in greater lateral stiffness for a given weight of structure. This with the "stretch" incidental to curving of the side sheet material results in permanently smooth, wave-free panels.

Curved Side Construction is a feature indicative of the *really* progressive thinking behind *every* detail of BALANCED DESIGN.

There are many more such new and distinctive ideas incorporated in Cincinnati New Cars. We will gladly explain them to any interested electric railway executive.

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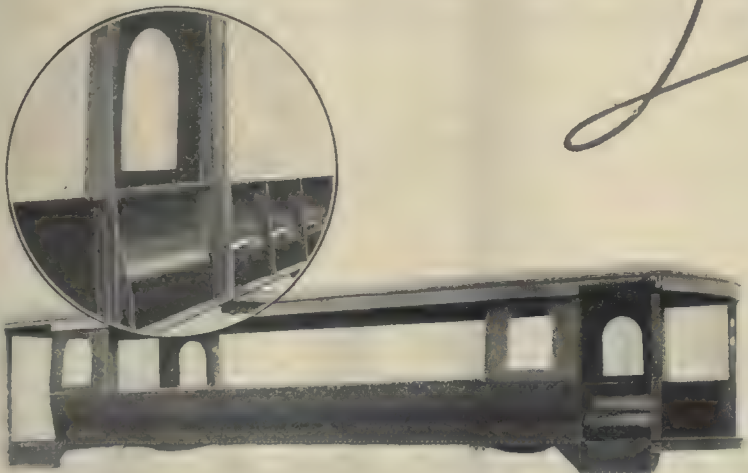
CINCINNATI
New
CARS



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More Frequent Service

PRICES

Standard 21-Passenger Street Car Type, complete, $3815
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SOLD BY DODGE BROTHERS
DEALERS EVERYWHERE

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—Fewer Empty Seats

Graham Brothers Motor Coaches can be operated frequently . . . They build good will . . . They cut down transportation waste.

More and more street railway operators are turning to medium capacity motor coaches. Their wider range of utility becomes increasingly apparent.

Preference for Graham Brothers 21-passenger street car type motor coach is being shown daily.

It is so attractive it invites riders—so quick, so comfortable and so safe it holds their patronage.

Maintenance costs are low. Operators can provide so frequent a service with Graham Brothers Coaches that public good will can be held and increased.

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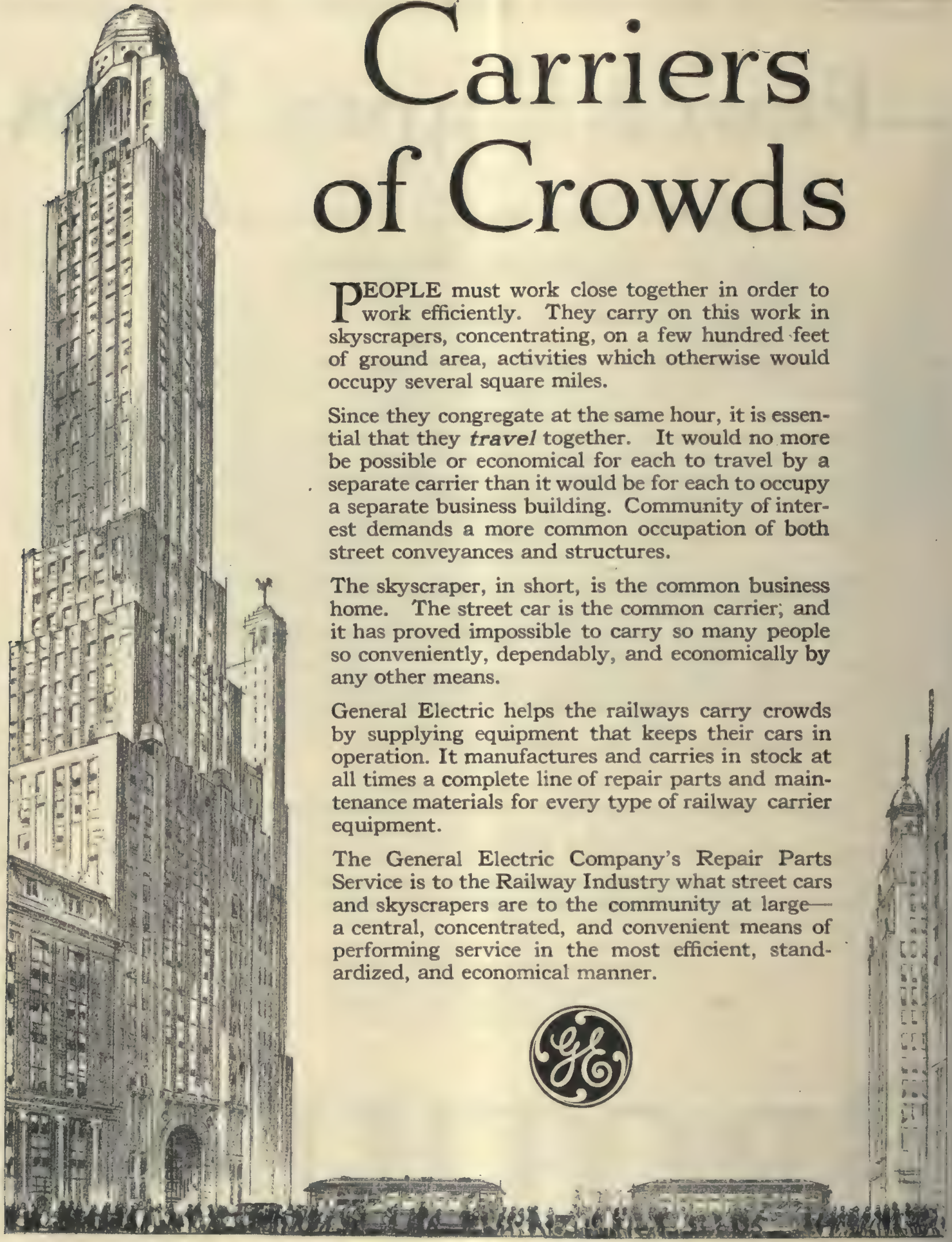

Carriers of Crowds

PEOPLE must work close together in order to work efficiently. They carry on this work in skyscrapers, concentrating, on a few hundred feet of ground area, activities which otherwise would occupy several square miles.

Since they congregate at the same hour, it is essential that they *travel* together. It would no more be possible or economical for each to travel by a separate carrier than it would be for each to occupy a separate business building. Community of interest demands a more common occupation of both street conveyances and structures.

The skyscraper, in short, is the common business home. The street car is the common carrier; and it has proved impossible to carry so many people so conveniently, dependably, and economically by any other means.

General Electric helps the railways carry crowds by supplying equipment that keeps their cars in operation. It manufactures and carries in stock at all times a complete line of repair parts and maintenance materials for every type of railway carrier equipment.

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330 45

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

Volume 69 New York, Saturday, January 22, 1927 *Number* 4

Mid-West Association Sets a Mark for Sectional Meetings

THE value of sectional association meetings for getting department heads and their assistants off the job and giving them a fresh and broadened viewpoint of their work was stressed by F. G. Buffe, vice-president in charge of operation Kansas City Public Service Company, at the recent meeting of the Midwest Electric Railway Association in Tulsa. Mr. Buffe maintained that the programs of such meetings should be built with a primary view to making them conferences on the improvement of service, building business and the analysis of methods developed by properties which have succeeded in improving their earnings.

Unquestionably this is a sound basis for sectional association work. In such meetings there is an opportunity for a much more intimate and general discussion of business building topics than can take place in a large national meeting. In these smaller meetings there is time for the department heads and their assistants to take an active part and to acquire direct contact with the most progressive thinking in their territory. They are led thus to look on the problems of their company as a whole, and to visualize the part which their individual departments play in the general success or failure. This makes for greater teamwork within the respective company organizations. In teamwork plus imagination lies the industry's salvation.

As Mr. Buffe pointed out, the discussion of detailed questions of technical practice have limited value in such a meeting. Little definite information is conveyed in the average convention paper on construction or maintenance practice. By reading of the practices of other properties in the technical press, where specific illustrations and figures are made available, much more ground can be covered in a given time and at vastly decreased expense than in a convention meeting. Where this does not suffice, personal visits to neighboring properties for first-hand inspection of new practices will yield far more actual information than can be gleaned from listening to the monotonous reading of a convention paper couched in generalities.

Those who attended the Tulsa meeting listened to a recital and discussion of operating practices which have improved the service, increased business, raised the employee morale and reduced costs on properties which have made definite and outstanding progress. Department heads and their assistants joined with general executives in questioning speakers and in discussing the subjects presented. The net result was a distinct inspiration to every man present. The program helped to take each man out of his individual job and to give him a better picture of the tendencies and opportunities in the industry of which he is a part. President Sawyer of the American Association commented on the excellence of the Midwest program, but pointed out that there were not enough railway men present from the territory covered by the association. It was noticeable that some of those properties which seem to be in greatest difficulty were conspicuous by the absence of their men. This very fact illustrates the value of such meetings and indicates the source of trouble on some properties. Their personnel needs to get out of the rut.

Truths Not Likely to Fail of Their Purpose

TWO addresses more stimulating than those of President Sawyer and Mr. Graham, made before the Midwest Association, have seldom been heard by audiences of electric railway men. Some may be inclined to judge Mr. Sawyer's remarks in the light of exhortation. Granting even that, they were not more so than the occasion demanded. As a concomitant to them was the record of accomplishment outlined by Mr. Graham. After all, it is the will to do that is important. But greater even than this is the preachment, pronunciamento, or whatever one cares to call it, that kindles the will to do where signs are not lacking that it is dormant or perhaps nearly dead.

As Mr. Sawyer indicated, commiseration seldom accomplishes much. The psychologists know this. On the other hand, the physiologists know that where there is not a malignant growth the patient is often assisted most by being helped to regain his sense of proportion. Pathologically speaking, there have been few tumors on the brain in this industry, but in far too many cases there has been ingrowing inhibition. Carrying the idea to the extreme, perhaps, Mr. Sawyer said that the fact that we have always done a thing in a given way is good reason for questioning the wisdom of that practice. It certainly is. But there is nothing to be gained merely from change for the sake of change. It is necessary to apply the criterion of fine discrimination.

Take the case of the question of the use of new cars. Mr. Sawyer says that the money spent for new cars and new facilities has been a profitable investment in every instance where it has been intelligently applied. The preponderance of the evidence is on his side. There has been far too much parsimony in this industry in the past. Its practice has become almost a fetish. Economy is one thing, but parsimony is something quite different. Unfortunately, the two had been allowed to become confused in the minds of many railway men. Too often have they thought they were practicing the one when in reality they had become the victims of the other. If Edmund Burke were the diagnostician of the industry's ills he would say that the railway operators have been more inclined to saving than to selection; that their so-called economy required no providence, no sagacity and no judgment, but a mere instinct, and one not of the noblest kind. Mr. Burke's definition of economy and parsimony has perhaps never been surpassed. Real economy, in his opinion, has larger views. It demands a discriminating judgment and a firm, sagacious mind.

Does all this seem elementary? The answer is "yes." But it is the distinction between the two that Mr. Sawyer and Mr. Graham have sought to bring home by being specific. That is the nub of the whole matter. The public must have public transportation service. As for the electric railway industry, it is trying to learn how to do a better job than it has been doing, and the man who misses this point in a convention is missing the very reason for his attendance at a meeting of this kind.

Certainly these two addresses by Messrs. Sawyer and Graham take high rank among the outstanding papers of their kind presented at utility conventions in recent years. It is well to recall that Guizot, the great French historian and economist, said: "Truth has already trouble enough in penetrating to the council of kings; let us not send it there pale and feeble; let it be no more possible to mistake it than to doubt the loyalty of our sentiments." And he would, indeed, be a doubter who questioned for a moment the loyalty of the sentiments of either Mr. Sawyer or Mr. Graham. They did not send truth out pale and feeble. As they handled truth it should not fail of its purpose.

Blair Plan for Chicago Transit Development Extends Over 22 Years

WITH but a few days remaining before the termination of the franchise, bonds and operating agreement of the Chicago Surface Lines the Council of that city is still talking about plans. This week the billion-dollar plan of Henry A. Blair, president of the Chicago Surface Lines, was presented to the Council committee on local transportation and underwent the first fire of criticism. The plan was not entirely new, as an outline was submitted to the Council in 1924 by Mr. Blair.

This plan, however, has been developed and augmented during recent weeks, largely in conference with other transportation representatives, so that at present it is said to meet with the tentative approval of other transportation authorities in Chicago.

A study of this plan, abstracted elsewhere in this issue, has the ring of genuineness. In it Mr. Blair fearlessly faces Chicago's civic needs and forecasts resulting transportation requirements up to 1950. The plan contemplates progressive development in three periods extending over 22 years, by which time the population of Chicago will have reached 5,000,000, according to conservative estimates. Even at this juncture the investment would be only $145 per capita, far below what it is in New York today, with essentially the same population as that estimated for Chicago in 1950, and even though much of New York's subway construction was accomplished in an era of lower costs.

From the initial total investment of slightly more than a quarter billion of private capital, the subways, rapid transit extensions, plus the surface lines extensions, and the addition of 60 miles of bus routes would equal $1,000,000,000 by 1950, approximately 56 per cent of which would be company investment and 44 per cent would be obtained from public funds.

Considering the merits of this plan from the standpoint of Chicago's economic development, which after all is the important factor, the program stands out in sharp contrast to the $50,000,000 or $100,000,000 contemplated in the Lisman proposal. If this larger plan is necessary to provide for Chicago's growth, and there seems to be agreement among the present leaders who are providing transportation today that it is, then it appears more impossible than ever that such a program can be contemplated on a 20 or even a 30 or 40-year basis. The present dilemma is evidence enough that an extensive development could never be consummated if progress must be halted periodically and the invested capital held in jeopardy while a new deal is made.

How Paris Approaches Rush-Hour and Other Operating Problems

ELECTRIC railway transportation problems in Europe are very much like those in this country and are being approached largely in the same way. This is clearly indicated by the article in this issue on "Increasing Car Speeds and Rush-Hour Carrying Capacity" by Paul Mariage, commercial manager of the Paris tramway and bus system. It shows, for example, that equal importance is laid in Europe as in this country upon the need of increasing car schedule speeds. It also shows that in Europe the answer to this question is felt to lie largely in a type of car designed especially to speed up the rate of passenger interchange and simplify the collection and registration of fares. Mr. Mariage's article also indicates that a great deal of care and thought are being given in Paris to means for increasing the rush-hour capacities of the company's system without unduly increasing the total number of cars and buses owned.

In these efforts, Paris tramway managers labor under some handicaps which to American managers would appear to be rather serious. One of these is the narrowness of the cars, made necessary because of the narrow streets through which they run. A second is the need, felt at least in Paris, for providing for two classes of passengers on every electric motor car and on the 36 and 48-passenger buses. Only on the trail cars and on the 25-passenger express type of buses are the passengers all of one class. A third handicap to rapid operation in Paris is the large variety of fares which have to be collected. Their number makes prepayment fare collection hardly possible.

Nevertheless, the Paris authorities have a number of accomplishments to their credit. They have produced a car the height of whose floor above the street is practically the same as the diameter of the wheels used, the car being boarded by a 14.4-in. and an 8-in. step, there then being a 10-in. riser to the main car body. With smaller diameter wheels than those used, it would seem as if these heights could be reduced materially. Paris also has a spacing between stops of about 820 ft. in the central portions of the city and 1,150 ft. in the outskirts, with good records for shortness in length of time of car stop. One reason for the latter condition is undoubtedly the very clear marking of stopping points, as mentioned in the article.

Problems of rush-hour capacity and provision of rush-hour crews are similar to those here. Among the solutions considered for the former (adopted elsewhere in Europe but not yet in Paris) may be mentioned that of folding seats which are turned up in rush hours to increase the carrying capacity of the cars. The principal solution for the rush-hour crew problem in Paris is the employment on the cars for short periods each day of employees in other departments than the transportation department. Thus, shopmen are being used as motormen, and members of other departments do miscellaneous transportation duties during the rush hours.

Philadelphia May Show the Way to Relief of Traffic Congestion

COMMENDABLE spirit has been shown by the various merchants' organizations in Philadelphia. Faced with a deal of strife and recrimination over the rigid anti-parking ban which was proposed by Director of Public Safety Elliott, nearly all of the groups agreed to accept a 30-day trial period for the measure. Evidently the director is gifted with a very persuasive tongue, for it was only after he had met with the Market Street Merchants Association at a luncheon held on the day scheduled for the final Council hearing on the bill that the organized opposition began to fade. He showed beyond peradventure that some radical steps were inevitable if complete traffic stagnation on the alley-wide streets of the city were not to result, and suggested that a trial be given to the parking ordinance over a limited period of time and with a reasonable program of enforcing the measure progressively over the downtown streets.

When the bill came before the City Council for its final hearing it was passed unanimously and later signed by Mayor Kendrick. Much local interest had been aroused because of the sweeping restrictions placed by the new ordinance. It forbids parking for periods longer than are required to load and unload passengers or to discharge merchandise in practically the entire downtown section of Philadelphia between the hours of 7 a.m. and 7 p.m.; it forbids parking at any time on streets less than 20 ft. in width and specifically names certain streets falling in this category; finally, it forbids any parking on the city streets between the hours of 3 a.m. and 6 a.m.

A peculiar situation had existed in Philadelphia prior to the passage of the bill. While the firms on some of the major thoroughfares were emphatically opposed to any suggestions that parking be prohibited in the vicinity of their establishments, the side street merchants were crying vigorously for relief from the abuse of parking rules. They claimed that they frequently were unable to receive shipments of merchandise, since the delivery trucks were unable to pierce the mazes of traffic or to find unloading space in front of the entrances. Hence some of the strongest advocates of the parking legislation came from the class which has generally shown the greatest opposition to any such proposals.

As is usual with such drastic regulation, a number of points remain to be worked out. Physicians feel that the plan will work a hardship on them and their patients. Ministers of downtown churches are fearful that serious inroads will be made on the attendance. Director Elliott has expressed a willingness to effect modifications in the present ordinance that may be found essential at the end of the trial period.

Similar plans have been tried in other cities with more or less success. Transportation men will watch Philadelphia with much interest, as the enforcement of a satisfactory ordinance there will show that traffic relief through the elimination of parking is feasible. This one thing will go a long way toward solving the congestion problem.

Work of Insurance Committee Demands Fullest Co-operation

EXPERIENCE of electric railway companies in connection with the purchase of fire insurance indicates that much can be done to clarify the situation. The rates vary widely, as was indicated in an editorial in this paper for Nov. 27. Furthermore, the record for 1925 shows that of $2,140,000 paid out in premiums only $607,000 was returned in fire losses, indicating an excessive rate. Improved practices in the construction of cars and structures are constantly tending to make the fire hazard less and less.

Conditions such as these have prompted the committee on insurance of the American Electric Railway Association to go into the matter this year even more thoroughly than it has done in the past. A questionnaire has been prepared and is being mailed out from headquarters requesting every company in the industry to give its insurance history and should reach every railway system within a week. It is of vital importance to the success of the committee's work that it receive an answer from each and every company, whether a member of the association or not. Only with experience of all the companies represented in its collective data can the committee speak authoritatively for the industry or properly represent it.

Nothing but good can come to any individual company by supplying full information. Managements owe it to the owners of their properties to see that the proper officers furnish everything asked for and cooperate with the insurance committee in every way possible.

Keeping Up with the New South

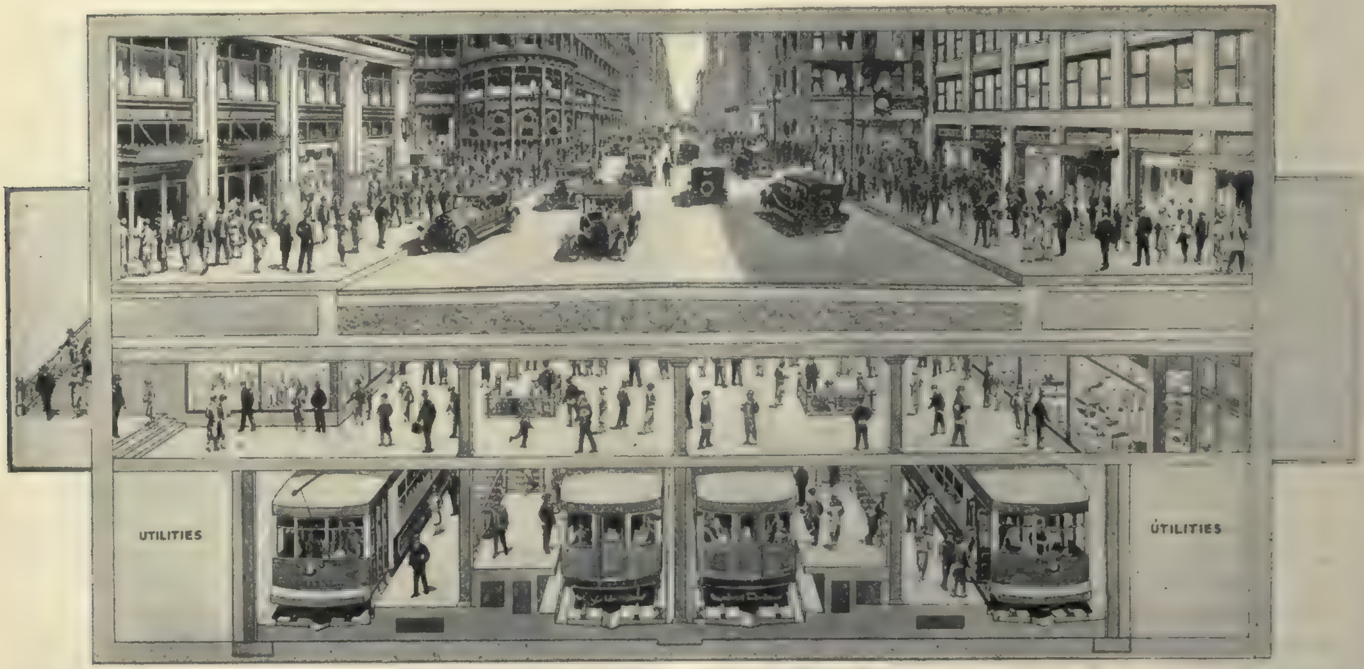
ONE of the builders of the new South was the late James B. Duke. Among his many undertakings was the construction of the Piedmont & Northern Railroad. It was one of the first, if not actually the first, line of its kind in the South, and it has done very well financially. Mr. Duke was ambitious for the road. The line as originally built was to be only the beginning of a much bigger system to be tied in with the gigantic plans he had for power development in the district. It was proposed to connect practically all of the cities of North and South Carolina, running from Greenwood to Durham probably after leaving Charlotte, east by way of Concord, Salisbury, High Point, Greensboro, Burlington into Durham.

The existing links in this system were built in 1912-13-14. Then came the war. Mr. Duke, like many others, had to put aside his personal plans in the interest of the general good. But he never put aside the idea. He harbored it all the while, but before he could perfect the necessary arrangment to carry out the plan he died. Now his associates propose to take up the task where he left off.

The estimated cost of the present undertaking is $15,000,000. By itself this sum bulks large. It is big, but it is only a small part of the vast sums that men of the Duke type have been pouring into the new South in a prodigious stream. It is small wonder that great interest attaches to this latest proposal to build an electric railway of 150 miles to traverse the great industrial belt of Piedmont along the line of what has been called "the workshop of the South."

Billion-Dollar Plan for Chicago Transit

Henry A. Blair, President Chicago Surface Lines, Presents a Plan to Develop the Three Present Systems of Surface Cars, Elevated and Buses—Unified Company Proposed with Terminable Permit Franchise—Report Contains Estimated Budget of Expenditures in Three Steps Extending to 1950 and Presents Estimated Earnings at an Average Fare of 7.35 Cents



State Street, Chicago, Shown in Cross-Section as It Would Appear with the Pedestrian Mezzanine and the Four-Track Subway for Rapid Transit and Surface Cars in Accordance with Plan Proposed by Henry A. Blair, President Chicago Surface Lines

DEVELOPMENT of the three general groups of transportation utilities in Chicago, consisting of surface car lines, elevated railroads and buses, into a billion-dollar system by 1950 is the construction program of a plan of progressive action presented by Henry A. Blair, president of the Chicago Surface Lines. The report containing this enormous program has been developed in recent months through conferences with the major interests involved and is said to have the general approval of these parties.

Subways with sub-level pedestrian concourses, extension to rapid transit lines, ultimate removal of the elevated loop, surface car line terminals and extensions with the buses used as feeders and for light line operation are all included in the plan. The report is worked out on the basis of three periods, 1928 to 1935, then 1935 to 1940, and the final period 1940 to 1950. Investments at the beginning of the period, standing at $273,000,000, will swell to $1,003,626,000 by 1950. The final total would be divided $563,274,000 as company investment and $440,352,000 as city investment in the permanent structures of the subway and elevated lines.

Table III, on page 156, shows the estimated investments detailed by periods for city and company considered necessary by Mr. Blair to accomplish the plan and to provide adequate transportation for the 5,000,000 citizens conservatively estimated for 1950.

The first necessary step is to obtain the passage of enabling legislation by the Illinois General Assembly to permit the granting of a terminable permit type of franchise. Legislation is also necessary to authorize the consolidation of the surface line companies, chartered under the street railway act, with the elevated lines, chartered under the railroad act; to extend the powers of the city relative to special assessments, and to remove the 20-year limitation on the right of the city to lease city-owned railways.

Following this legislation the second step would be to effect the consolidation of the present companies into one, and the third step to grant a terminable franchise to the one recognized corporation, to remain in effect during good behavior or until the city should exercise its option to purchase.

TABLE I—CONSTRUCTION PROGRAM FOR CHICAGO DIVIDED INTO THREE PERIODS USED IN THE BLAIR REPORT

	Structure Miles
For the period 1928 to 1935	
Elevated	16.71
Joint occupancy in subways	5.86
Rapid transit subway	3.43
Surface car subway	4.45
For the period 1935 to 1940	
Subways	9.92
Elevated	21.45
For the period 1940 to 1950	
Subways	7.76
Elevated	56.74

It is estimated that such unified operation could be accomplished on an average fare of 7.35 cents, with free transfers between the lines of each basic type of system and eventually between all services. On the schedule outlined a maximum fare of 7.71 cents will be reached in 1933 and the minimum fare of 7.06 cents in 1950.

THE PHYSICAL PLAN

Pending the construction of subways 1,000 new cars of a larger type would be purchased for the elevated system and 600 for the surface lines.

Immediate construction of four units of subways and elevated lines would be started. This would include a four-track subway in State Street from North Avenue to 23d Street, a four-track subway under Washington from Ogden to Michigan, with a two-track extension to a loop under Grant Park and another two-track extension under the park just east of Michigan Avenue to connect with a two-track subway under Adams Street. The Adams Street two-track subway would extend west to Halsted Street. The fourth unit would be a two-track elevated line extending from the present structure at Harrison Street east of State, along Harrison and Wells to Wells and Van Buren, where it would connect with tracks on Wells Street at separate levels. This unit would serve until such time as funds would be available for a subway along the west side of the central district.

These units are classed as the most urgent and should be provided immediately. The State Street subway would be used for both rapid transit and surface cars. This step will relieve part of the present elevated structure and give two rapid transit entrances into the city from the north and the south. The street surfaces would be relieved by the removal of many surface cars. The west side would be helped in thus having more use of the elevated structure and the full use of the surface car subway in Adams Street.

TABLE II—ESTIMATED USE OF THE PROPOSED TRANSPORTATION UNITS BY YEARS

	Passengers Using Surface Cars or Buses for All or Most of the Ride	Passengers Using Rapid Transit for All or Most of the Ride	Passengers Using Both Types of Transportation for the Ride
1926	870,000,000	224,500,000	....
1935*	955,000,000	390,000,000	140,000,000
1940*	1,073,000,000	475,000,000	194,000,000
1950*	1,200,000,000	800,000,000	400,000,000

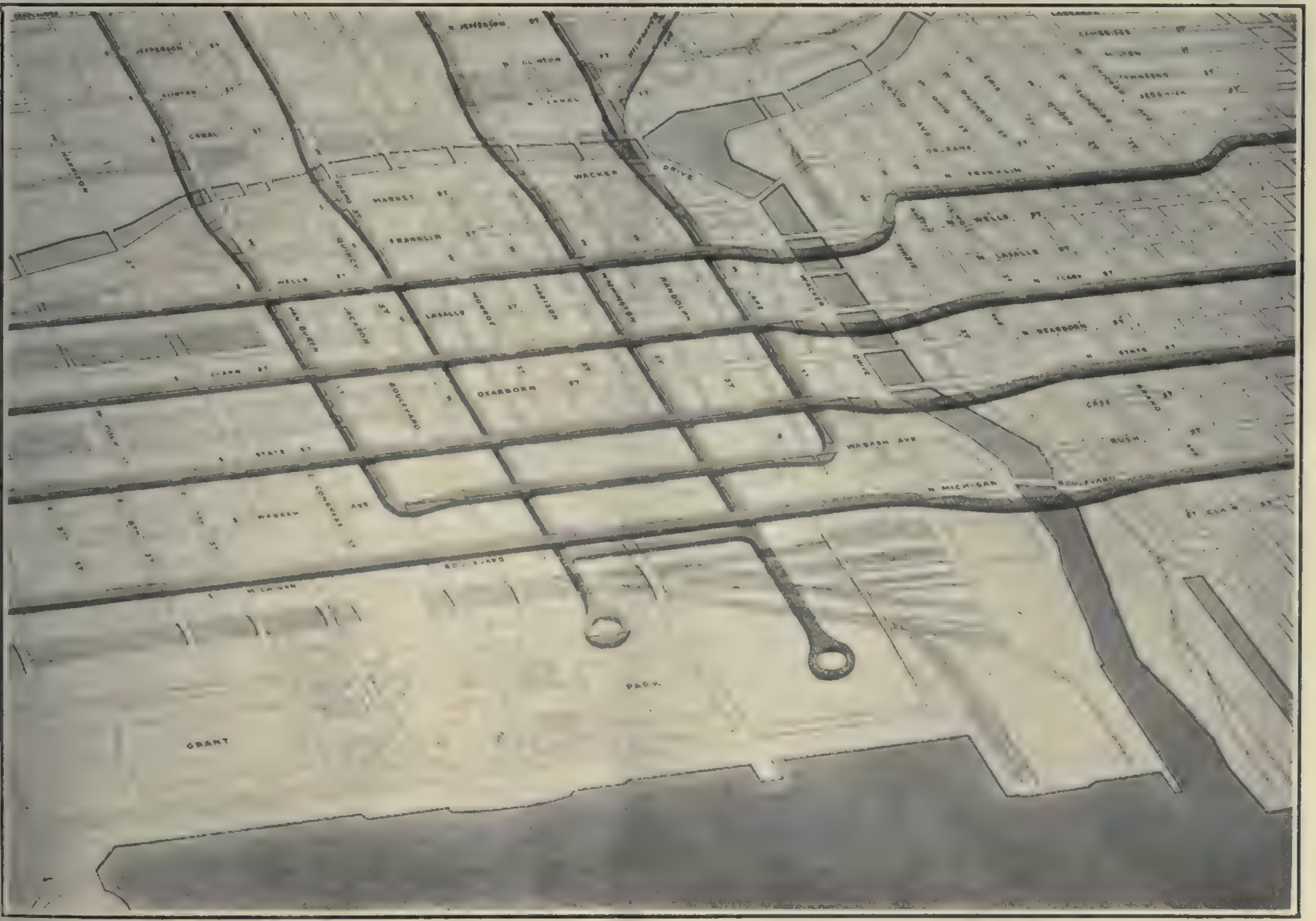
*Fares collected would not be divided as these columns show when under the consolidated plan.

One of the important features of the State Street subway is the pedestrian mezzanine extending from building line to building line with direct entrances to stores and buildings facing State Street. The three kinds of traffic will thus be essentially separated on State Street, the vehicles on the street surface, pedestrians on a level below and rapid transit and surface lines below that. This is well illustrated by the cross-section view.

FUTURE CONSTRUCTION

Following the immediate subway units, other tubes should be started on Lake, Wabash, Van Buren and a cut-off along Milwaukee from Paulina to Lake. When completed these units will permit the removal of the present elevated loop. The table on page 154 shows the miles of structures to be built in each period.

The report points out that not all of the development would be confined to the central district. In the first three years there should be 40 miles of track extensions



Subway Development by 1950 in the Central District of Chicago as Proposed in the Blair Report

Table III—Estimated Investments by the Company and the City for the Three Periods from 1928 to 1950

	Company Investment		City Investment		Cumulative Total Investment
	Period	Total	Period	Total	
Company's original investment..........	$273,000,000	$273,000,000	....	....	$273,000,000
First period—1928 to 1935................	113,902,000	386,902,000	$172,920,000	$172,920,000	559,822,000
Second period—1936 to 1940..............	62,520,000	449,422,000	110,034,000	282,954,000	732,376,000
Third period—1941 to 1950................	113,852,000	563,274,000	157,398,000	440,352,000	1,003,626,000

and 60 miles of streets supplied with bus transportation. During the same period 600 old surface cars should be replaced, at the rate of 200 per year. Other cars will be altered during this period as to the arrangement of doors, platforms, etc., to make them more convenient. Other improvements cited are loop terminals at turn-back points, feeders, substations, new carhouses, additional shops and equipment and additional service equipment.

Improvements to elevated lines involve the purchase of 1,000 large and modern cars, the installation of a complete track signal system with automatic control and the rearrangement of routes and station layouts to provide better accommodations for the traveling public.

FINANCIAL FEATURES OF THE PLAN

The assumed base capital of $273,000,000 at the beginning of 1928 is the certified capital of the Surface Lines group and the Chicago Rapid Transit plus the additions to the capital account of $8,000,000 that will be made before the plan becomes effective. Some $5,000,000 of this additional capital will be allocated to a stabilizing fund.

The city will provide the funds for the subways and elevated structures from special assessments or otherwise and the consolidated company will provide the funds for equipment, consisting of tracks, cars, electrical facilities, ventilating apparatus, drainage systems, station equipment, substations, shops, yards, carhouses and other miscellaneous property used in operation.

Amortization of part of the company's capital has been provided for at the rate of 1 per cent of the capital account annually from 1933 to 1937, 1½ per cent from 1938 to 1942 and 2 per cent thereafter to 1950. The yield is to be applied to the retirement of mortgage bonds. By 1950 a total of $134,237,000 will have been accumulated and the retirement of bonds thus made possible will reduce the fixed charges and also the purchase price should the city decide to exercise its option.

Operation will be essentially on a service-at-cost basis and therefore public benefits such as the 55 per cent of surface lines net earnings, paving, street cleaning and sprinkling and similar indirect taxes have not been included, since these are considered unfair burdens on the riders. Likewise no return has been contemplated on the city investment, since the building of rapid transit facilities is considered in the same category as additional streets or analogous to street-widening projects.

While many courts have established 8 per cent as a fair return on invested capital, 7½ per cent is suggested in this report.

By 1950 the total investment in rapid transit will be $145 per capita, which is not considered excessive.

Chicago Rapid Transit Takes Leading Part in First-Aid Campaign

THE first-aid training school conducted by the Chicago Rapid Transit Company, Chicago, Ill., under the direction of Dr. Hart E. Fisher, head of the medical department, graduated nearly 300 student-employees during 1926. Regularly constituted members of the board of examining physicians of the American Red Cross are in charge of the final test to which each employee is submitted before he becomes eligible for a first-aid certificate. All classes of Rapid Transit employees, trained for any emergency, any time or at any place, passed the rigid Red Cross examinations. With more than 100 other employees already enrolled in first-aid courses, this year promises to establish an even higher mark than that set in the record-breaking year just closed.

Included in the courses offered for study by the Red Cross through the Chicago Rapid Transit Company school are the Schaefer prone-pressure method of resuscitation; treatment of fracture and the application of splints; rescue from contact with electric current, and treatment; stopping blood flow and application of roller and head bandages; restoration from fainting, and the transportation of injured.

Not only have first-aid educational activities been centered on employees of the Rapid Transit Lines but considerable effort has been expended toward education of the public. During the year 1926 a first-aid team of picked experts gave 184 demonstrations before public gatherings aggregating 87,000 persons. The Rapid Transit Lines also have the distinction of having won the Chicago city championship in first aid for two of the last three years. Interest taken by employees in the work has caused the school to set a "100 per cent" mark in first-aid training on the Rapid Transit Lines.

TABLE IV—ABSTRACTED EARNINGS STATEMENT ESTIMATED FOR CHICAGO'S CONSOLIDATED TRANSIT

Calendar Year (1)	Revenue Passengers (2)	Operating Expenses, Taxes and Renewals (3)	7½ Per Cent Return on Average Net Company Capital (4)	Amortization on Average Capital* (5)	Total Columns 3, 4 and 5 (6)	Less Miscellaneous Earnings (7)	Required Passenger Revenue (8)	Average Fare, Cents (9)
1927	1,115,400,000	$64,268,000	$20,475,000	....	$84,743,000	$1,924,000	$82,819,000	7.42
1930	1,190,000,000	67,977,000	22,083,000	....	90,060,000	2,053,000	88,007,000	7.39
1935	1,345,000,000	71,650,000	27,952,000	$3,819,000	103,421,000	2,320,000	101,101,000	7.52
1940	1,548,000,000	80,661,000	30,621,000	6,651,000	117,933,000	2,670,000	115,263,000	7.45
1945	1,767,500,000	90,744,000	31,313,000	9,875,000	131,932,000	3,036,000	128,896,000	7.30
1950	2,000,000,000	101,382,000	32,110,000	11,136,000	144,628,000	3,450,000	141,178,000	7.06
						Average fare............................		7.35

* The amortization fund starting in 1933 will total $134,237,000 by 1950.

Increasing Car Speeds and Rush-Hour Carrying Capacity[*]

A Discussion of Various Factors Which Enter Into These Two Matters, with Particular Reference to Electric Railway and Bus Operation in Paris

By Paul Mariage
Commercial Manager Société des Transports en Commun de la Region Parisienne, Paris, France

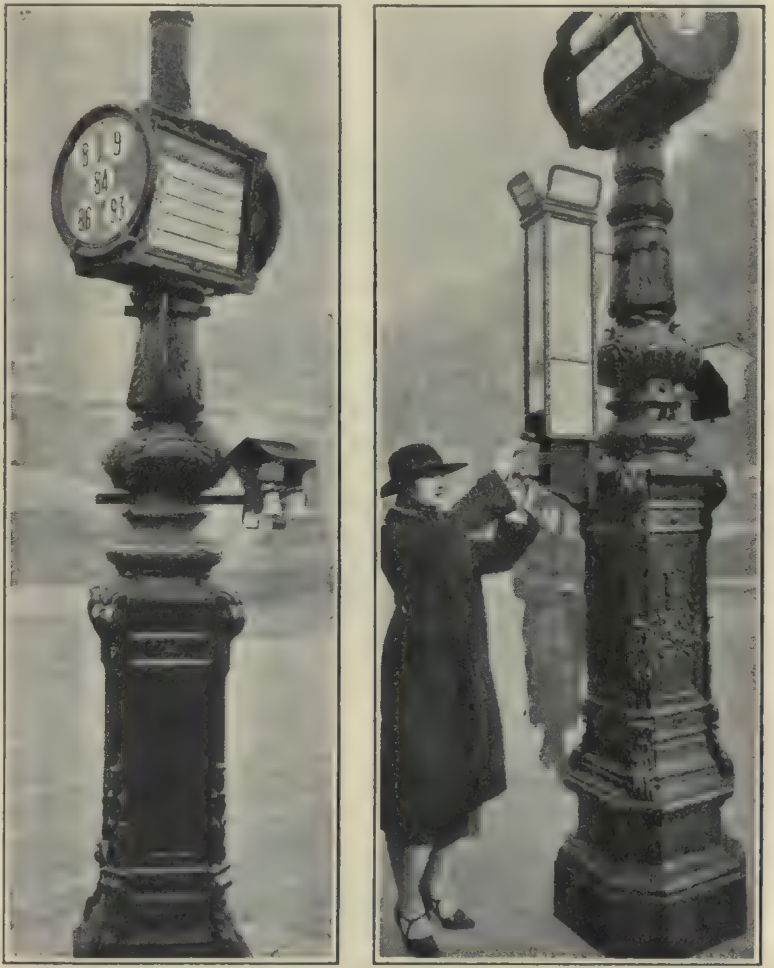
RARELY does the average citizen who finds the use of the bus and tramway car necessary in his daily life realize the extent of the organization required to provide proper service. If he did, he would make greater effort to approve and promote legislation by which the acuteness of the conditions under which local service is given would be lessened. Two problems which vitally concern the economy of electric railway and bus operation are schedule speeds and rush-hour carrying capacity. As increases in each without too great expense are generally sought, particulars of the way in which the problem has been approached in Paris should be of interest. Incidentally, it might be said that the S.T.C.R.P., which operates all the tramway and bus lines in Paris, has 32,000 employees, 128 tramway lines and 75 omnibus lines.

DISTANCE BETWEEN STOPS

In cities with heavy traffic streets the principal factor in causing reduced speed is street congestion. In Paris the schedule speed of the street cars varies from 6.8 m.p.h. to 10.7 m.p.h. and of the buses from 7.3 to 9.4 m.p.h.

In other cities where there is great street congestion, as in Marseilles, London, Brussels and Barcelona, schedule speeds of cars do not differ greatly from these figures.

A second factor which has an effect on schedule speed is the number and extent of the grades and curves on the line. The speed of a car is not only automatically checked as it ascends grades but limits have to be put on the rate of descent. Thus in Paris, buses and cars are not allowed to descend grades at more than 5 m.p.h. when the grade is more than 4 per cent. In Geneva the longest grade is about a mile with an average of 3.35 per cent and the steepest part has an incline of 7.43 per cent for about 250 ft. The car speed permitted, both ascending and descending, is 5 m.p.h. As will be seen, this about corresponds with Paris practice.



Methods of Issuing Queue Tickets in Paris

The illustration at the left shows the long-familiar method used in Paris for determining order in queues of waiting passengers. When a person intending to board a car reaches a stopping point he tears the uppermost number from one of the packages of numbers shown in the illustration, one package being for movement in one direction and one in the other. The numbers are called in order when a car arrives. This plan saves the passenger from taking his place in a waiting queue. The other illustration shows an improved form of number-issuing machine now being tried in Paris. Both illustrations also show the method of marking car stops. The route numbers of cars passing this point are indicated at the ends of the cylindrical looking car stop sign mounted on the lighting pole. The panel at the side gives further details by route numbers of the several routes which pass this particular stopping point.

Schedule speed is also a factor of the time of passenger interchange, and this time, in turn, is affected by the number and sizes of car doors, height of car platforms above the street and other features of car design. It was owing to delays in loading that led to the adoption as the standard in Paris of a center-entrance car with two large doors, low steps and a large passenger entrance reservoir.

The effect of the use of more than one class of compartment on car speeds is open to question. On the other hand, the use of trailers with the same type of entrances as the motor car is thought in Paris not to increase the length of station stops.

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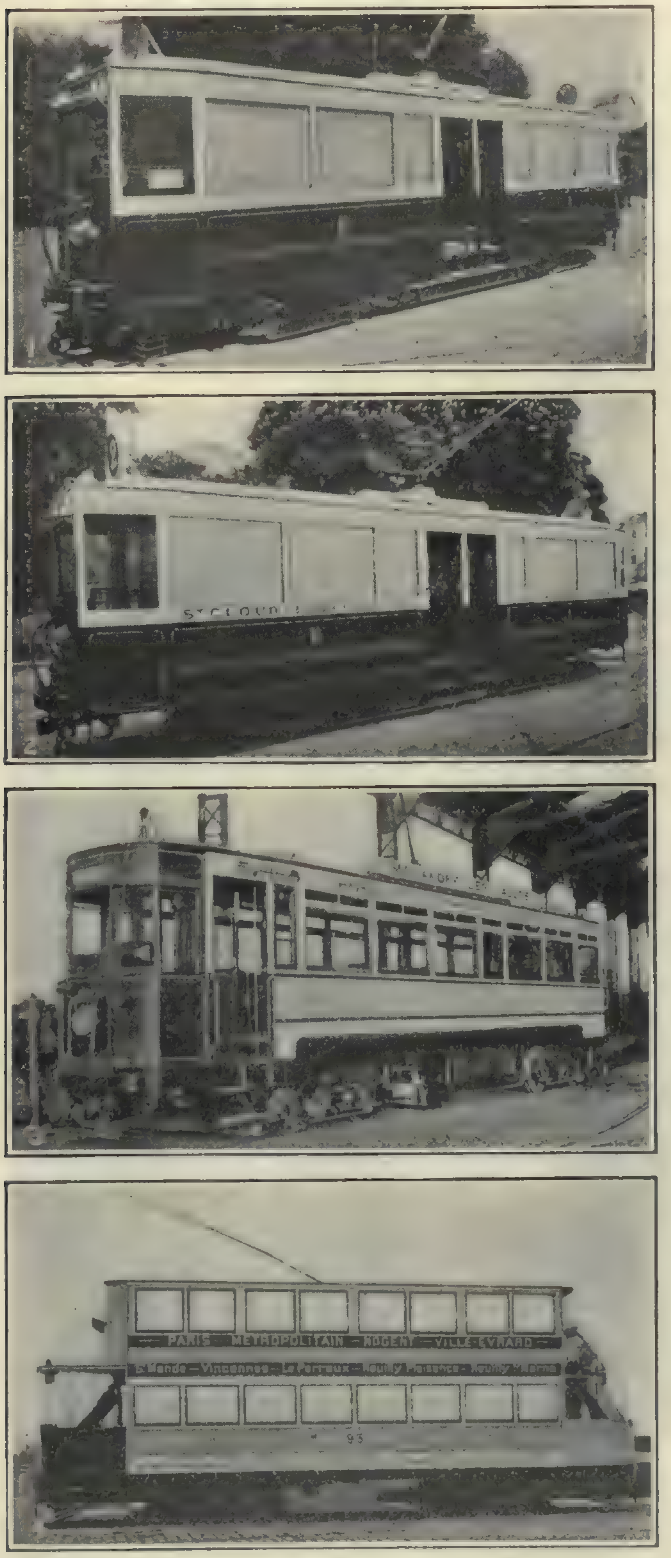
[*] Abstract of paper presented at the biennial meeting of Union Internationale de Tramways, de Chemins de Fer d'Intérêt Local et de Transports Publics Automobiles, Barcelona, Spain, Oct. 10-16, 1926.


ST CLOUD
PARIS — METROPOLITAIN — NOGENT — VILLE-EVRARD
St Mande — Vincennes — Le Perreux
93

Types of Motor Cars Used in Paris

The present standards of cars on the Paris Tramway System are the type G car shown in Fig. 1 and the type L car shown in Fig. 2. An extended article about the type L car was published in the issue of this paper for Sept. 11, 1926. Both type G and type L cars have a wheelbase of practically 11 ft. and over-all length of 37 ft. 4 in. Owing to the narrowness of these cars only three people can be seated across a car instead of four as in an American car. Cross seats are used, but the seats are placed back to back. This arrangement is standard in all of the cars except in the double-deckers. The latter have longitudinal seats on both decks. The car shown in the first illustration weighs, empty, 14,850 kg. (32,670 lb.) and that shown in the second 12,800 kg. or 28,160 lb. Both have a capacity of 30 seated and nineteen standing passengers, though in each case there is capacity for four more standing passengers when the car is used as the second car in a train. The car shown in Fig. 3 has a capacity of 32 seated and nineteen standing passengers, and the double-decker in Fig. 4 of 70 seated and four standing passengers. The double-deck types are used only on a few routes in the outskirts of the city, except on special occasions, such as Sundays and holidays in summer.

The method of fare collection undoubtedly is another factor. The fare most rapidly collected is that which can be paid by a single coin. On properties where this fare can be used prepayment with a fare box is the logical method. Unfortunately, railways with zone systems cannot usually follow this plan. In Paris fares are not collected at the entrance, but by the conductor after the passenger takes his seat or standing position. The conductor passes continually from one end of the car to the other calling out "Fares, please." As passengers pay their fares they receive from him fare receipts torn from a pad and punched to indicate the amount of fare paid and the point to which the passenger is entitled to ride. This fare receipt must be held by the passenger during his trip and must be produced at any time when called for by inspectors who board the cars frequently. It is upon this inspection that the company depends for checking over-riding and riding without payment of fare. During rush hours fare receipts are sold by employees of the company to passengers on the street about to board the cars.

Still further to speed the service, the company is considering requiring all passengers to buy tickets before boarding the car. The conductor would then cancel each ticket by a machine which would stamp on the ticket the number of zones for which it was valid. At the same time the machine would automatically register the number of passengers carried by class and by amounts of fare paid.

MEANS FOR INCREASING SCHEDULE SPEEDS

In several cities limits are placed by law on the maximum speeds permitted. Thus in Paris the highest speed allowed is 30 km. (18⅝ miles) per hour on through streets and 20 km. (12½ miles) per hour on cross streets. This speed has to be reduced to 8 km. (5 miles) an hour on descending grades of 4 per cent or more, at crossings and turnouts, while crossing switches, when passing points at which stops are usually made, when the tracks cross from one side of the street to the other, when the cars enter congested streets and when they are passing points considered dangerous.

The speed permitted buses varies to some extent with the type of bus used. The maximum of 35 km. (21¾ miles) per hour is allowed to the smaller and lighter buses, i.e., those with capacities of from 25 to 38 passengers and weighing from 10,500 lb. to 17,600 lb., but at various points all speeds must be reduced, as well as during fogs, over bridges, etc.

Schedule speeds can be increased by shortening the time of passenger interchange and by varying the schedule speed according to the conditions of place and time.

The rate of passenger interchange is speeded up in Paris on the public streets by three means, namely, by the use of safety areas, methods for forming loading queues and special island platforms. The plan of safety areas is followed on a number of properties. The method of forming loading queues in Paris is somewhat peculiar to that city and its value is questionable. Persons waiting to take a car are required to supply themselves at the corner at which they are waiting with numbers which indicate the order in which they are permitted to board the car, provided the latter has spare carrying capacity. Two bundles of these numbers are attached to a post near the stopping point, as shown in an accompanying illustration. Recently, however, an automatic number-issuing machine, also shown herewith, has been put into experimental use, though it has not been in use long enough to determine its value. It has a capacity of 6,000 tickets, as compared with 1,000 in the ordinary distributor. It not only effects an economy of 6 per cent in tickets issued but there is a saving in the time of calling the tickets, since fewer are lost. This cuts down the length of station stops.

In cars which are not of the pay-as-you-enter type the principal features in car design affecting length of station stop are width of doors and height of steps. On the two latest types of street cars built for the Paris system the width of each of the two doors is 34 in. and on the trail cars the width of each of the two doors is 29½ in. The height of the steps is shown in inches in the accompanying table.

TABLE OF HEIGHTS IN INCHES OF PARIS CAR STEPS
(LATEST DESIGNS)

	Type G Motor Car	Type L Motor Car	Type A Trailer
First step......	10.8	8.0	9.5
Second step..	14.6	14.4	14.9

On the buses the width of the entrance is 24.8 in. and the height of the first step above the pavement is approximately 14½ in. in a loaded bus and from 17 to 19 in. in an empty bus. In addition to this step, there is a second to the platform and a riser between the platform and the car floor. In the very latest type of bus an effort has been made successfully to provide easier access. By means of a low hung frame the height of the platform has been brought to only about 10 in. above the pavement and between the platform and the car floor in this type of bus there is only a riser.

The second method mentioned above of increasing average schedule speed is by changes in schedule running time according to conditions. In Paris schedule speeds vary with the time of day and parts of the line.

EFFECTS OF INCREASED SCHEDULE SPEED

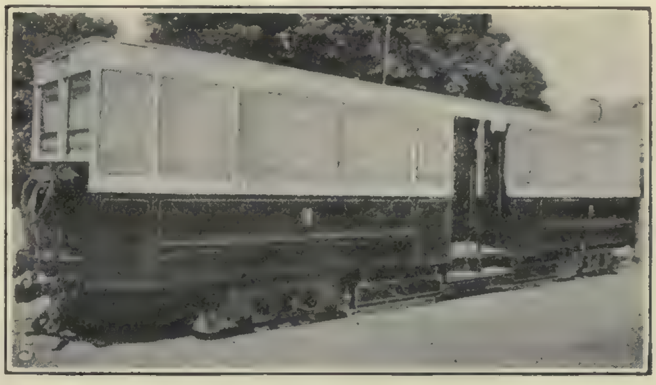
Increases in schedule speed will now be considered as to their effect (1) on traffic, (2) on economy in the use of equipment, and (3) on accidents.

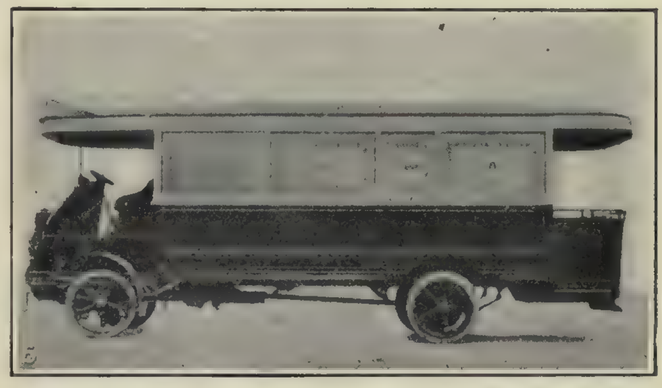
It is very difficult to give any rule as to the effect of schedule speed on volume of traffic because the extent of riding depends on so many causes. Nevertheless, it is only fair to assume that an increase in schedule speed will be accompanied by an increase in patronage, especially of long-distance passengers. Experience indicates that between comfort and speed in travel most passengers would choose speed.

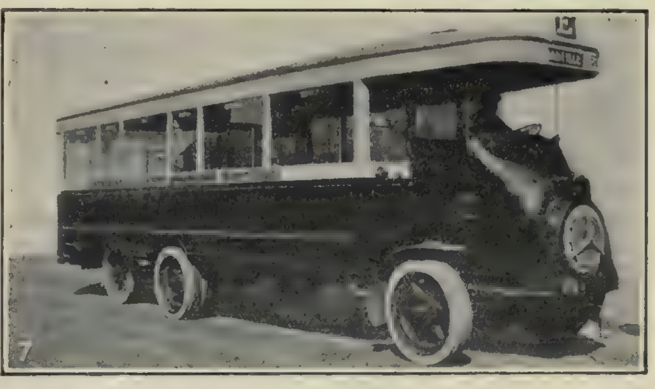
There is also a distinct gain in economy of the use of equipment when the car-miles or bus-miles are increased in relation to the car-hours or bus-hours. Thus a smaller number of cars at high speeds can serve a line at the same headways than a larger number of cars at low speed, with consequent saving in equipment and personnel. On the other hand, higher speeds tend to increase the number of accidents. Comparison of two lines in Paris in which operating conditions were practically the same is shown in the table on page 160.

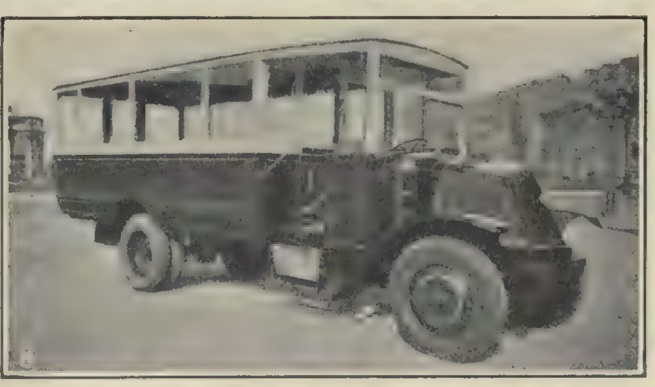
DISTANCES BETWEEN STOPS

The principle followed in determining the distances between car stops on the Paris system is that the distance should vary inversely to some extent with the density of traffic, although, practically, other factors









Double-Truck Trailer and Standard Buses, Paris

Fig. 5 shows the Paris double-truck center-entrance car usually used as a trailer and known as type A. It weighs empty 8,800 kg., or 17,600 lb., and when used as the second car in a train has a capacity of 34 seated and 24 standing passengers. It is designed to carry only second class passengers, whereas the cars shown in Figs. 1 to 4 have accommodations for both second and first class passengers.

Figs. 6, 7 and 8 show the standard motor buses in Paris. Fig. 6 has cross seats back to back and a capacity for 28 seated and ten standing passengers. Fig. 7 has a similar arrangement of seats and capacity for 40 seated and eight standing passengers. The two buses shown in Figs. 6 and 7 have rear platforms and rear entrances. Fig. 8 is the express type of bus with seats for 25 passengers. It has a front entrance and pneumatic tires.

The body of the bus shown in Fig. 6 has a weight of 1,800 kg. (3,960 lb.). The chassis weighs from 5,150 kg. to 5,350 kg. (11,330 lb. to 11,770 lb.), depending upon the type used. The total weight of the six-wheel bus, shown in Fig. 7, empty, is 7,340 kg. (16,148 lb.). The 25-passenger bus shown in Fig. 8, has a weight empty of 5,385 kg. (11,847 lb.).

RELATION OF SPEED AND ACCIDENTS, PARIS

Line A	Schedule Speed in m.p.h.	Number of Accidents Per 1,000 Car-Kilometers
Ordinary service	7½	0.428
Express service	10⅝	0.493
Line B		
Ordinary service	7½	0.384
Express service	11¼	0.776

have also been considered. Thus, in general, stops must be located at all important street intersections and other like points.

Car stops may be divided into two classes, namely, those where a car would naturally stop and those established by the management as convenient points to receive and discharge passengers. In the first class are important loading points, places on the line considered dangerous for a car to enter without a stop, and zone limits. On the average line in Paris the proportion of these obligatory stops to the whole number is about 30 per cent. Optional stops are then located at logical points between obligatory stops, based on the observed movements of passengers. The spacing used between stopping points is about 250 m. (820 ft.) in the central portions of Paris and 350 m. (1,150 ft.) in the outskirts of the city or where the streets are not congested.

The average length of obligatory stops is fifteen seconds when the speed is less than 12½ m.p.h., twenty seconds when it is more than 12½ m.p.h., twenty-five seconds at carhouses where there is a change of crew and thirty seconds where a change has to be made from conduit to overhead trolley operation, or vice versa. At the optional stops five seconds is the average time allowed where the speed is less than 12½ m.p.h. and ten seconds where it is more than this rate.

In Paris all stops are marked by enameled sheet iron disks attached to the street lighting poles and colored red if the stop is obligatory and green if it is optional. All lighting posts carrying these disks are furnished with green shades over the lamps so that they are distinguishable at night. The latest type of stopping sign is shown in the same illustrations that show the method of issuing tickets to waiting passengers. There are two disks on the lamp pole separated by panels. the disks show the route numbers of the cars which pass that point. The panels contain information by route numbers of the principal streets covered by the cars on each route.

On the bus lines a special stopping rule is in force after 9 p.m., when the traffic on the street is less than during the day. Under this rule any bus will stop on signal to discharge a passenger at any point which is farther away than 50 m. (165 ft.) from a regular stopping point.

Conspicuous marking of car stops has two distinct advantages from an operating point of view. The first is that it collects waiting passengers definitely at one point so that the time of loading is reduced to a minimum. The other is that it makes easier any desired change in the number or position of car stops. Thus, in Paris a study is now being conducted to determine the possibility of reducing the number of stops by about 20 per cent.

INCREASING RUSH-HOUR CARRYING CAPACITY

The means for increasing rush-hour carrying capacity which appear to be most important are as follows: (1) Increase in the number of cars and the employment of cars of larger capacity, (2) increase in schedule speed, (3) short routing of cars, (4) use of cars with folding seats, (5) establishment of express or direct service.

The first method, increase in number of cars or use of larger capacity cars, is followed on the Paris system by the employment of trail cars. On a great many lines single trailers are used and on a number of lines operating outside the city trains of three or four cars are employed. The company has a number of double-deck cars with from 74 to 83 seats each, but they require the use of two conductors, and their use is limited to a few routes in the outskirts of the city except on special occasions, such as on Sundays and holidays during the summer season.

Daily car inspection is arranged with the idea of having at least 83 per cent of the rolling stock available at the beginning of the day, 90 per cent at 11 a.m., 94 per cent at 1 p.m., 95 per cent at 2 p.m. and the entire equipment by 4 p.m.

Adjustment of the rush-hour schedule is complicated by the agreement which the company has with its motorman and conductors. This agreement provides:

	Hours
Average working time per week	48
Maximum working time per day	9½
Maximum spread of work	13½

Meal relief times are also specified, and for the morning shift cannot be before 10:30 a.m. or after 1:30 p.m. and for the afternoon shift cannot be before 4:30 p.m. or after 8:30 p.m. A spread of 13½ hours must not be exceeded in any case.

It will be seen that these rigid regulations make economic arrangement of schedules very difficult, since the heavy traffic period continues for about fifteen hours or from 5:30 a.m. to 8:30 p.m. To help the situation the company has had recourse to the following:

Women are employed as conductors during four hours of the day; some shopmen work as motormen during part of the day; some employees in other departments do miscellaneous transportation work on part of their time; on Sundays and holidays it is quite common to transfer men from one division to another according to the extent of the traffic; men are not permitted time off on days of heavy traffic; some overtime is paid to volunteers, etc.

Of the second and third methods of coping with rush-hour traffic, listed above, means of increasing schedule speed has already been considered in this article, and short routing of cars is used to a considerable extent.

The fourth method of increasing rush-hour capacity, mentioned above, is by the use of folding seats. Several companies in Europe are using successfully seats arranged to fold and swing out of the way during the rush hours to increase the standing room and hence the carrying capacities of the cars during this period. Up to the present this plan has not been followed on the Paris system, but it offers a means of coping with the rush-hour situation. The plan seems especially adapted to prepayment lines.

The introduction of express service or direct lines was the final method suggested above for increasing rush-hour capacity. A test of this plan was made with buses in Paris recently. The buses made only a few of the stops made by the regular lines, but the experiment did not prove very satisfactory and was abandoned. One trouble was that the loads were carried in one direction only. Another was that in congested streets it was difficult for the express buses to make much better time than the local buses. The experiment showed, however, that there is a field during the peak hours for an express bus service at higher rates over the same general routes followed by the ordinary buses, provided the express buses can make considerably better time.

The Lyons Tramway & Omnibus Company has been operating some express buses of this kind at higher fares with success. It has found that on the streets where this service of buses and tramcars operates together the express bus service has speeded up all the traffic on the street and so helped the tramcars to make better time.

An Added Source of Revenue

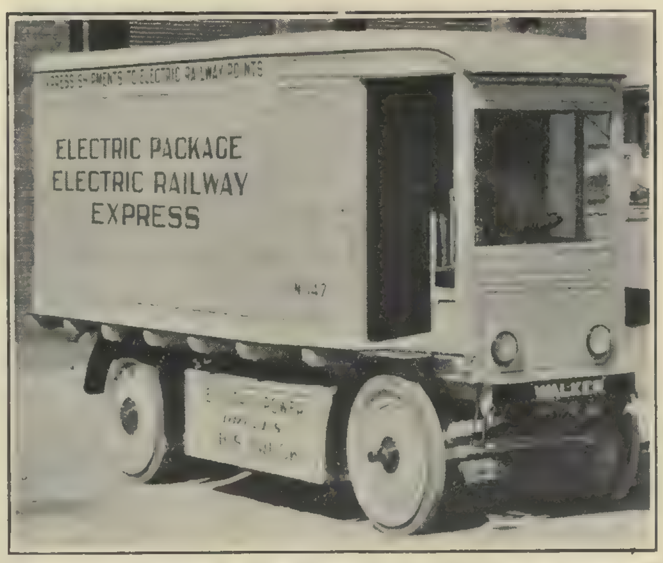
Electric Railways May Provide an Attractive Express Service in Conjunction with Their Normal Freight Movements

By F. W. Brown

Manager Electric Package Agency, Cleveland, Ohio

METHODS of obtaining additional revenues for electric railways, as well as for increasing the capacity to serve, are of importance at any time, and at this time when store-door delivery is being given consideration, the subject of express shipments on electric lines naturally comes to mind. It may not be generally known that in the main express shipments are in a class by themselves and that there is no conflict between such shipments and freight. That is, shipments that are intended to move by express will so move, and as electric railways do not, except in a few instances, provide such express service, the business goes to the old line express company.

The features of express service that make it differ from freight are essentially such as to make it a preferred service, for which the shipper or consignee seems willing to pay. The pick-up and delivery does not by any means constitute the entire difference. Cash-on-delivery service, insurance for valuable merchandise, as well as less packing restrictions, all are identified with express shipments. In these days of rapid movement of freight by electric railways, the "Order Bill of Lading" is too slow and the merchandise is at its destination long before the bill of lading is at the bank. This causes confusion and dissatisfaction; while with the c.o.d. express shipment, delivery is immediate and the payment at that time closes the transaction, so far as the consignee is concerned, all at once.



A New Electric Truck that Has Just Been Added to the Electric Package Agency Fleet in Akron, Ohio

As stated earlier, there is enough difference in the class of shipments moving by express and by freight so that there is no conflict between the two. Shippers not providing their own trucks find but little, if any, difference in the cost by express and by freight plus drayage, with the advantage of expediting movement by express.

The Electric Package Agency, acting as agent for the Lake Shore Electric Railway, the Cleveland-Southwestern Rail & Light Company and the Northern Ohio Power & Light Company, performs an express service between all stations located on these lines and to Detroit via the Detroit United Lines and to Youngstown via the Pennsylvania-Ohio System. All the features of the express service are furnished by the Electric Package Agency, and the rates charged are the same as by the old line express company. Soliciting, advertising, auditing, filing of tariffs and investigating of claims are matters taken care of by the Electric Package Agency, as well as provision and maintenance of all street equipment and the pick-up and delivery service. The rail lines furnish the transportation between terminals in the same manner and in the same cars as they transport interline and local freight shipments. It has been found that the regular freight car movements are frequent enough so that with but one exception additional service is unnecessary.

Street Equipment Used in Cleveland, Ohio, in Making Door-to-Door Pick-Ups and Deliveries

Giving Credit for Service

IT IS the purpose of the *Buyer's Guide* to boost home business by telling people why Massillon dealers serve them best.

Sometimes, however, we overlook the fact that every merchant is not selling tangible merchandise. Sometimes he is selling service only, but he is really a merchant just the same. And when you buy service and get good service, you are getting more than your money's worth.

The illustration we have in mind is one which occurred right here in the Guide office last week. We were looking for a shipment of paper over the Electric Package Company's lines. It was an important shipment, and every minute's delay meant real money.

Meeting Paul Englehardt, 1434 Sixth Street, driver for the Electric Package, we asked him to watch for the shipment and snap it to us. Englehardt probably gets lots of rush calls, and knowing this we expected we would get our paper "when it came."

But next morning early in walks "Pauly," with his eternal beaming grin, saying, "Here's your stuff. Just came in." That little extra service on Englehardt's part saved us dollars and kept in good humor an exacting customer to whom we, in turn, were trying to give service.

That is what we mean when we say that whether a man sells merchandise, service, or both, it is a pleasure to know that "Massillon serves you best," and if Englehardt reads this, he'll know we appreciate the kind of service he sells.

—*Buyer's Guide*, Massillon, Ohio.

Quality of Service Rendered in Massillon, Ohio, by the Electric Package Agency Is Commended by the Local "Buyer's Guide"

The express shipments are loaded last in the same car with the freight or, where the volume for any one point is sufficient, the entire car is used, but such is handled in the same train with freight cars. It will be seen that this additional tonnage which cannot be secured except by furnishing the express features of the service is added at an attractive rate with little or no additional expense.

Express rates are usually three times greater than first-class freight rates. The expense of performing the pick-up and delivery and other features of the express service is approximately one-half of the gross revenue from this source, thus leaving to carriers a rate per ton well above the first-class freight rate, or double the average rate received for freight shipments handled at the same time. The volume obtainable, however, is much smaller.

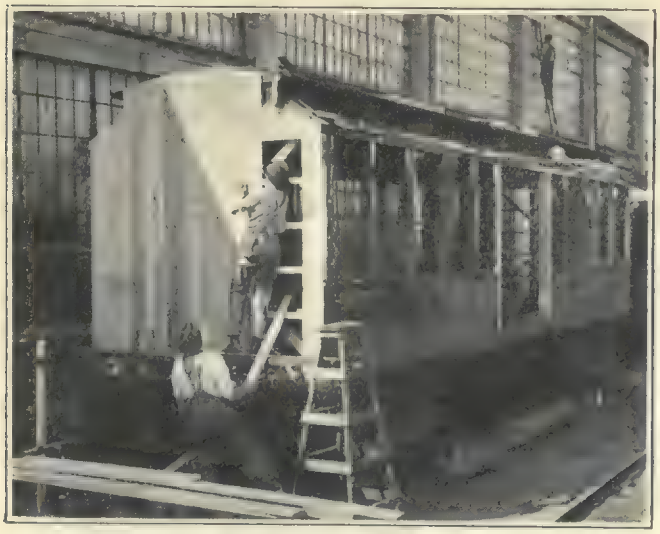
Such a service would not be profitable if performed separately; it should be in addition to service now operating. Nor can individual lines establish such a service locally; it would necessarily have to be operated separately and to include all connecting lines now operating through cars in interline freight service, its scope being to provide on electric lines the same service now provided on steam lines by the American Railway Express Company. The Electric Package Agency has performed such a service for a number of years for the lines it represents. While the territory it covers is limited, yet the gross earnings received from this source are such as to make it interesting, especially as there is but little additional cost to the carriers because of its operation.

Old Passenger Cars Rebuilt for Freight Trailers

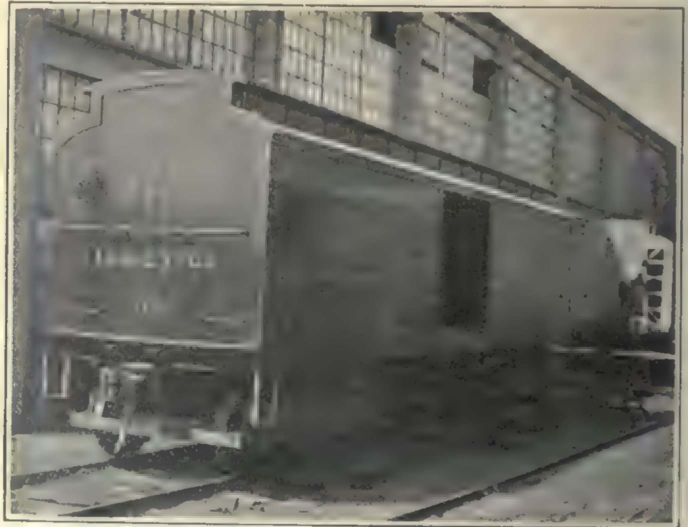
SEVERAL old wood passenger cars have recently been converted into freight trailers by the Indiana, Columbus & Eastern Traction Company at the Springfield, Ohio, shops. The views show the method of accomplishing this conversion. After the windows, seats and interior fittings have been removed the ends and sides are covered with tongued-and-grooved side sheathing, which is then painted the Pullman green used on the passenger cars of the company.

Motors, gears and control are also removed and the air brake equipment arranged for operation in train service. The hand brakes are changed as shown in the accompanying illustration of the completed car. Standard freight car door openings are cut in each side and inside hung doors mounted.

The two cars shown were completed during the summer and fall months at an average cost of $835 each. They will be put in service on the company's lines to care for its growing carload freight business.



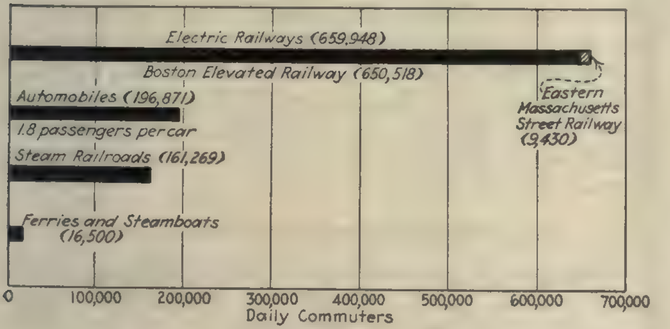
Reconstructing an Old Type Passenger Coach for Use as a Freight Trailer in the Springfield Shops of the Indiana, Columbus & Eastern Traction Company



One of the Freight Trailers Just Rebuilt from a Passenger Car. A Few Years ago the I., C. & E. Purchased Several New Light-Weight Passenger Cars to Replace Old Heavy-Weight Wooden Ones

Boston "L" Issues New Guide Book

INFORMATION concerning car and train service of the Boston Elevated Railway, maps of the system and pictures of interesting and historic spots in and around Boston are given in a revised book just issued. The cover is a colored representation of the Park Street station and surroundings, showing Boston Common and the State House. Colored maps show the surface car lines, rapid transit lines, bus lines and foreign connecting lines. Under the head "The Elevated Carries the Commuters" a striking diagram is presented showing clearly the fundamental character of the co-ordinated transportation system in metropolitan Boston. The relation of the riding habits to transportation service is convincingly brought out. Figures are presented to show that traffic congestion can be reduced by increasing use of the Elevated lines. The booklet is compiled and distributed jointly by the Elevated and the Boston Chamber of Commerce.



Figures Show that the Boston Elevated Carries Nearly 70 Per Cent More Commuters than All Other Means of Transportation Combined

High-Speed Articulated Cars for W., B. & A.

Ten Two-Car-Body Units, Each Mounted on Three Trucks, Will Supply Limited Service Between Washington and Baltimore—Easy Riding Qualities and Superior Appointments

ORDERS for ten articulated cars have recently been placed by the Washington, Baltimore & Annapolis Electric Railroad with the J. G. Brill Company. When completed these cars will supply the half-hourly service on the 40-mile double-track main line between Baltimore and Washington. The double-car units will be mounted on three trucks and except for the rigid connection between the front and rear bodies through the agency of the articulated mounting on the middle truck the unit will be operated as one car, having, however, the passenger carrying capacity of two cars. Four motors per unit will be used, mounted two on each end truck in the standard manner. One set of control and air brake equipment will be used per unit. The cars are arranged for double-end operation, a motorman's cab being built in the right-hand section of each front vestibule.

The service between these two cities, based on studies extending over several years, is such that a two-car capacity is always required. Nearly all of the traffic handled between Washington and Baltimore is through business, since the intervening territory is sparsely settled. What local service does exist is handled on a two-hour headway by individual cars. In addition to this, the Baltimore to Annapolis trains operated via the Naval Academy Junction supply local service for the northern section of the main line.

For the through business between Washington and Baltimore, this company is in competition with the Pennsylvania and the Baltimore & Ohio Railroads and the Washington Motor Coach Company. Thus speed and comfort are essential factors. In these trains it is expected that greater riding comfort will be obtained due to the articulation, since the rigid connection reduces the tendency to side sway or to nose.

NEW ROLLING STOCK NEEDED TO INCREASE PASSENGER RIDING

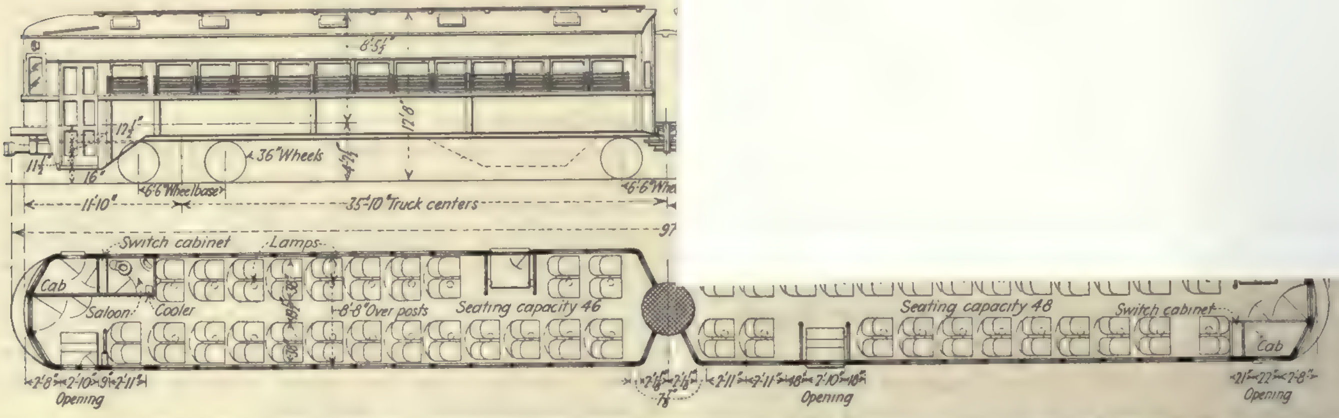
Immediately following the cessation of the World War and the gradual curtailment of governmental activities there was a very pronounced falling off in Baltimore-Washington traffic. On the other hand the business on the company's two other lines between Baltimore and Annapolis held up to a greater extent despite the increasing use of automobiles. This new equipment will be directed, therefore, at the division showing the greatest relative losses. The company has for many years enjoyed more than half of the Baltimore-Washington traffic, so that these new cars will not only tend to check losses but they will also provide an agency whereby a greater share of this very desirable business can be obtained.

At present the company operates between excellent terminals near the center of each city, and while the running time from terminal to terminal is 85 minutes, because of relatively slow operation over city streets, this differential over the steam road schedules of one hour is not so obvious when the time and money element of a taxicab or street car ride necessary to reach the steam road terminals is taken into consideration.

By this change in equipment not only modern steel equipment of more attractive design will be available but a more economical unit will thus be created. The weight saving alone, unit per unit, is nearly 30 per cent, or over 23 tons. Four motors instead of eight, one set of electrical and air brake control as against two, three trucks as against four, will all reflect savings in operating and maintenance costs.

ONE DOOR USED FOR ENTRANCE AND EXIT

The passenger carrying capacity is the same as two cars, since two car bodies are used. Due, however, to the permanent connection and the easy access between units of the articulated train, it is planned to use one door for entrance and egress to the articulated car, and the conductor will control all passenger movement from one position and handle the fare collection of the complete car. In addition to the 34-in. door openings near the middle end of each car body an end door of the same width is available for use at terminals. All doors will be pneumatically operated.



Side View and Floor Plan of One of Ten Articulated Cars Being Constructed for the Washington, Baltimore & Annapolis Electric Railroad

These cars will supply limited service over the 40-mile double-track line between Washington and Baltimore, operating on a 30-minute headway. The present wood cars, in constant service since 1910, weigh approximately 80 tons per train. The new articulated units are estimated to weigh 59½ tons.

Each car body will have a length of 47 ft. 8 in. and when mounted the articulated unit will have a total length over all of 97 ft. 4 in. The seating capacity of each half unit is nominally 48, except that space for one double seat is used for the installation of the saloon at one end of the car bodies. A flush lavatory and basin will be supplied in each saloon.

The seats will be double-rotating chairs of Hale-Kilburn manufacture. The backs will be curved, as illustrated in the diagram, and heavily padded. Seats will be constructed with individual spring cushion pads and individual arm rests at the end. Frieze plush will be used for the outer covering. Ample knee room will be available, since the seats are to be mounted on 35-in. centers, and they will thus conform to the side window spacing.

Double wood flooring will be used, the bottom to be laid lengthwise and the upper crosswise. The top floor is to be covered with a standard type of cut-out Pullman rubber tile.

Supported on steel carlins, the arch type roof will be constructed of tongued-and-grooved sheathing covered by canvas in the conventional manner.

per unit with double-end HL type control, arranged for operation on either 600 or 1,200 volts. Propulsion current is obtained from an overhead 1,200-volt trolley in the city of Baltimore as well as on its private right-of-way from that city to the District Line, then overhead 600-volt trolley to Fifteenth and H Streets, Washington, after which the cars are operated over the 600-volt underground conduit system of the Washington Railway & Electric Company.

BRAKING PRESSURE REGULATED BY LOAD

Westinghouse automatic and straight air brake equipment will be used. It will be designed to apply pressure to the wheels of all three trucks in proportion to the relative weight on each.

Special attention is being given to all of the interior details, such as lighting, heating and ventilating. It has been decided to use 22 double coil truss plank heaters controlled by a thermostat in each section. Both the heaters and the ventilators, ten of which will be used in each section, will be manufactured by the Railway Utility Company. The company has adopted a deep letterboard in lieu of the Gothic glass which this company had previously used and which is in keeping with the modern interurban cars. Plate glass is used in the windows and will give a pleasing outlook to the passengers.

Cab-Controlled Couplers Speed Up San Diego Service

High-Speed Multiple-Unit Trains at San Diego Demonstrate Merits of Combination Air and Electric Car Coupler in Heavy Interurban Service, Where Speed in Coupling and Uncoupling Is Essential

By R. G. Averill
Commercial Engineer Ohio Brass Company

COMPLICATED coupler problems were involved in the equipment of 50 cars purchased by the San Diego Electric Railway early in 1923 from the American Car Company of St. Louis. These cars were intended primarily for train operation and had full motor equipment with multiple-unit control, but they were also designed so that they could be operated individually, as either one-man or two-man units.

On the Interurban Line as Many as Six Cars Are Used in a Train

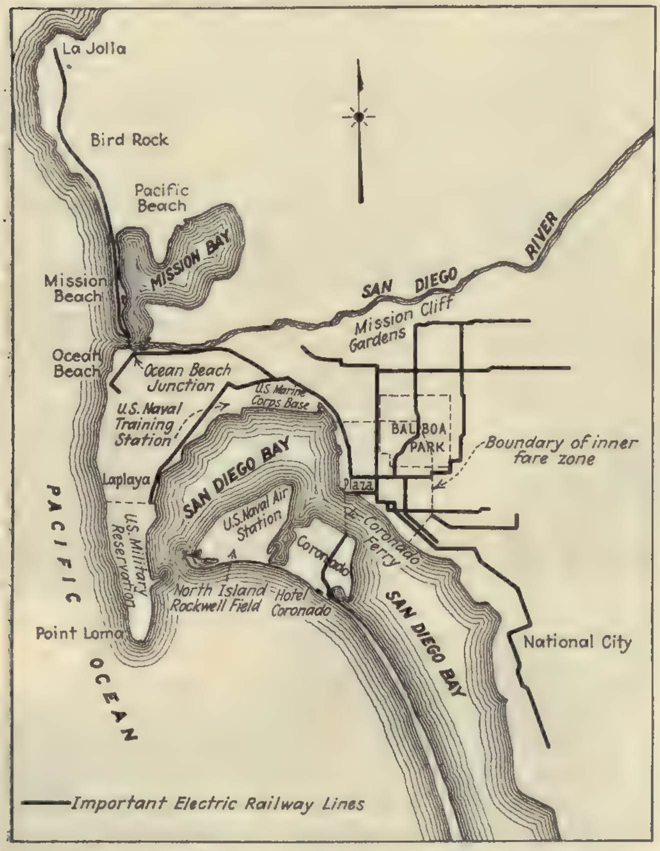
A Passenger Train at the Plaza in the Central Business District of San Diego

The train operation in which these cars are being used is on the Mission Beach and La Jolla line and on the Ocean Beach branch line. The traffic on these routes is highly fluctuating and has a pronounced seasonal variation as it is largely tourist and amusement park traffic. It was necessary, therefore, to provide peculiarly elastic trains and trains which could be coupled or uncoupled quickly en route, as these trains generally comprise a three-element unit which uncouples at two points on the outward journey and is again reassembled in a reverse manner at these same two junction points. A train of from three to six cars leaves the plaza at San Diego and runs as a unit under the control of a single motorman through the city streets, northwestward around the harbor and across the base of the Point Loma Peninsula to Ocean Beach Junction, a total distance of 6 miles, in a scheduled running time of eighteen minutes. Here the rear one-third of the train is detached, practically with no delay, to turn south to Ocean Beach, while the front section proceeds north 1 mile to the Mission Beach amusement center. Normally the leading car of the train is detached at Mission Beach and proceeds 6 miles further north to La Jolla. The total running time from San Diego to Mission Beach is 21 minutes, while to La Jolla it is 35 minutes. The return trip, of course, is simply a reversal of the evolutions described for the outward journey and all cars are again collected into a single unit for operating over the city streets. This minimizes congestion of traffic in the business center and has proved a popular as well as efficient method. From the description of this operating system it will be evident that speed in coupling and uncoupling cars, while loaded and in regular service, is an essential factor in maintaining a satisfactory schedule. These coupling and uncoupling operations not only must be done quickly but they must be casual incidents, entailing no annoyance or discomfort to passengers. At first thought these may not seem remarkable requirements, but such a conclusion is due to a failure to appreciate all the necessary operations involved in making a complete coupling between modern multiple-unit motor cars. Perhaps a tabulation of some of these requirements will prove interesting and may win for the lowly coupler some measure of the respect which its humble performance of vital functions merits:

1. Automatic mechanical coupling upon impact. The

physical connection which must withstand all tensile and compressive stresses incident to train haulage and coupling shocks. The coupler face at the ends of a car or train must be in condition (without requiring preliminary adjustment) to engage a counterpart coupler quickly and securely when the two are brought together. The coupler must be anchored securely yet flexibly to the platform underframing to provide for car haulage and still permit the necessary horizontal, vertical and torsional movements required of coupler bars on coupled cars when traversing curves and abrupt grades.

2. Manually controlled uncoupling means, whereby a trainman on either adjacent platform can quickly and safely effect an unlocking of the couplers and separation of the cars.



This Map Shows the Principal Lines of the San Diego Electric Railway

3. Automatic coupling of two air brake pipe lines upon impact.

4. Manual control equipment on each platform for positively opening valves in both air brake lines after the couplers have been engaged and for closing these valves (during the uncoupling operation) before the coupler heads can be disengaged. The movements of the valves on both platforms must be subject to the control of an operator in either car.

5. Automatic electric coupling, involving the closing upon impact of sixteen independent train line and control circuits and of a separate power bus line circuit.

6. Manual control equipment on each platform for operating, pneumatically, special drum type switches on coupled ends of cars, each switch serving to close the several circuits leading to the electric couplers subsequent to coupling, and to open them prior to uncoupling. The movements of the switches on both platforms to be subject to the control of an operator in either car.

7. The provision of a positive mechanical interlock between the electric coupler disconnecting switch and the air brake pipe valves on each platform. This prevents the switch being closed when the valves are closed, or the switch being open when the valves are open, a safety feature which insures that no "live" contact parts will be exposed on the uncoupled ends of a car or train. No car can be operated with the air valves open because such a condition automatically applies the brakes. It also safeguards train operation by insuring the necessary opening of air line valves between cars (for proper braking conditions), as otherwise no power can be supplied the cars back of the platforms where switches are open and valves closed.

8. A pneumatic interlock between the disconnecting switch engine and the uncoupling cylinder. This prevents couplers being separated until after switches have opened all electric coupler circuits and consequently prohibits any possibility of arcing at the electric coupler faces during uncoupling.

9. The provision of an electric interlock which insures the interruption of all train control and bus line current between cars upon initial movement of the uncoupling button at any station where uncoupling may be required. This is a safeguard for the disconnecting switches as otherwise they might be required to break heavy bus line currents, should uncoupling be made while the train is moving and with power on the motors.

10. A special arrangement of the circuits involved in the coupling up operations which renders them ineffective until mechanical coupling between cars has been completed. This is an important safety feature which prevents any possible opening of the air brake valves on the uncoupled ends of a car or train, more particularly while in motion. Emergency brake applications are thus prevented even should "coupling" button be pushed.

11. The provision of a concealed interlock button in the coupler control, push button box which must first be pushed in before the main coupling or uncoupling buttons can be operated. This, of course, is merely an added safeguard to prevent an inquisitive child or other unauthorized person causing an uncoupling by pushing an uncoupling button at some unoccupied cab station.

12. The provision of a coupler equipment having a practical and safe system of control which permits uncoupling of cars or train sections at full schedule speed, if desired.

Not one of these requirements is unessential to an acceptable operation of these trains. All have been achieved by simple means, without complication, and without addition to the duties of the train crew. As a matter of fact, the coupling and uncoupling operations have been greatly simplified and the attendant labor reduced. Entering between cars is no longer necessary to complete the mechanical coupling, to couple up the air hoses or to insert the end plugs of the train line and the bus line jumpers in their sockets. A motorman simply approaches the car to which he is to couple, engages the couplers, and then, without leaving his station, presses the coupling button. This energizes electro-pneumatic valves under each platform, admitting air to the disconnecting switch engines, which completes the coupling operations by closing the switches and simultaneously opening the valves in the air brake pipes. There need be no delay in service due to coupling, as cars equipped with this form of remotely controlled coupler apparatus have been coupled on the fly while running at 20 m.p.h. It is the difficulty of correctly estimating car speeds which renders this procedure hazardous, not any limitations imposed by the couplers.

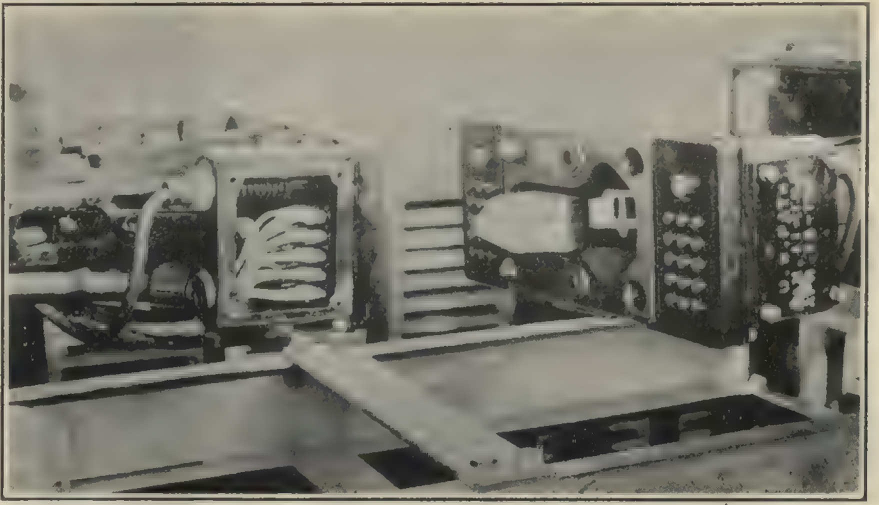
Uncoupling is equally simple and it is entirely safe, as well as possible, to uncouple while running at full speed. At the desired point, the conductor on the rear end of the forward section presses the uncoupling button, which energizes another set of magnet valves and operates the disconnecting switches on both platforms to the open position. After air valves are closed and switches are open, further travel of the switch engine piston admits air to the uncoupling cylinders and the coupler hooks disengage, allowing the cars to separate.

Never, prior to this San Diego installation, had cab-controlled coupler equipment (including bus line electric couplers) been used on a commercial scale in regular daily service. The novel character of the equipment, and more particularly its control, it was thought, justified this rather detailed description. To the more practically inclined, the convincing record of 2½ years of daily operation may prove even more interesting.

The coupler proper is of the well-known Tomlinson type, attached to the car by means of an oil-lubricated ball anchorage and supported in a special spring carrier to permit trains to travel over the abrupt Broadway grades. The electric couplers bolt to the sides of the coupler heads and thus afford maximum clearance underneath, which is important on low cars used in city service. The bus line cables (two parallel branches from the electric couplers combined into a single car cable), which terminate in the large contacts in the upper portions of the electric coupler faces, pass back through the terminal chamber entirely inclosed in insulating sleeves. Thus double current capacity is provided at the bus contacts as well as complete protection for the train line and auxiliary circuits which occupy the terminal chambers. The disconnecting switch comprises three switch boxes and a pneumatic driving engine, all coupled together as an operating unit on a common bed plate which also serves as a mounting means for attaching the switch unit to the car underframing. The two electro-pneumatic valves are mounted on a bracket under the platform near the corner of the step where they can be reached (in emergency) for manual operation of the valve stems. The push button box or operating station is located above the center window of the vestibule where it can be conveniently reached and yet where it will not attract attention or be accessible to children.

The cars equipped with these couplers are large, double-truck, double-end, city cars of arch,-roof, drop-platform design. They are 47 ft. 5 in. in length over buffers with 23-ft. truck centers and weigh 48,740 lb. fully equipped. They will seat 57 passengers and have a total estimated capacity of 90. One, two and three-car trains employ one trolley pole on the front car for current collection. When more than three cars are operated as a train trolley poles are used on the first and last cars to reduce the amount of current drawn from a single trolley wheel, and also to reduce the current passing from car to car through the bus line. Heavily loaded six-car trains have been observed, however, running with only one pole up. This is good proof that generous overload capacity is afforded by the bus line couplers.

The San Diego Electric Railway uses 70 cars during the morning rush hour, 60 during the middle of the day and 92 for the evening peak from 4:20 to 5:40. Eighty-five thousand passengers per day is not an uncommon load in one of the peak tourist seasons. One of these peak seasons is in the winter, when the city has a large temporary population of Eastern visitors. The other is during summer months, when it regularly entertains a considerable number of people from Arizona and the interior valleys of southern California. During other parts of the year, however, there is a large and constantly growing traffic, because San Diego is the metropolitan center of a vast surrounding region.


A Combination Coupler Head that Is Giving Good Service Under Arduous Conditions

It should also be remembered that the city is the home port and supply base for the destroyer division of the Pacific fleet; that the chief army and navy aviation base for the Pacific Coast is at Rockwell Field, on North Island, in the harbor; that the Marine Corps base for the Pacific is here, and that the U. S. Naval Training Station as well as the U. S. Naval Hospital are permanent institutions at this port. The considerable population of these several military bases supplies an interesting and important contribution of car riders which is particularly desirable as it usually constitutes an off-peak load.

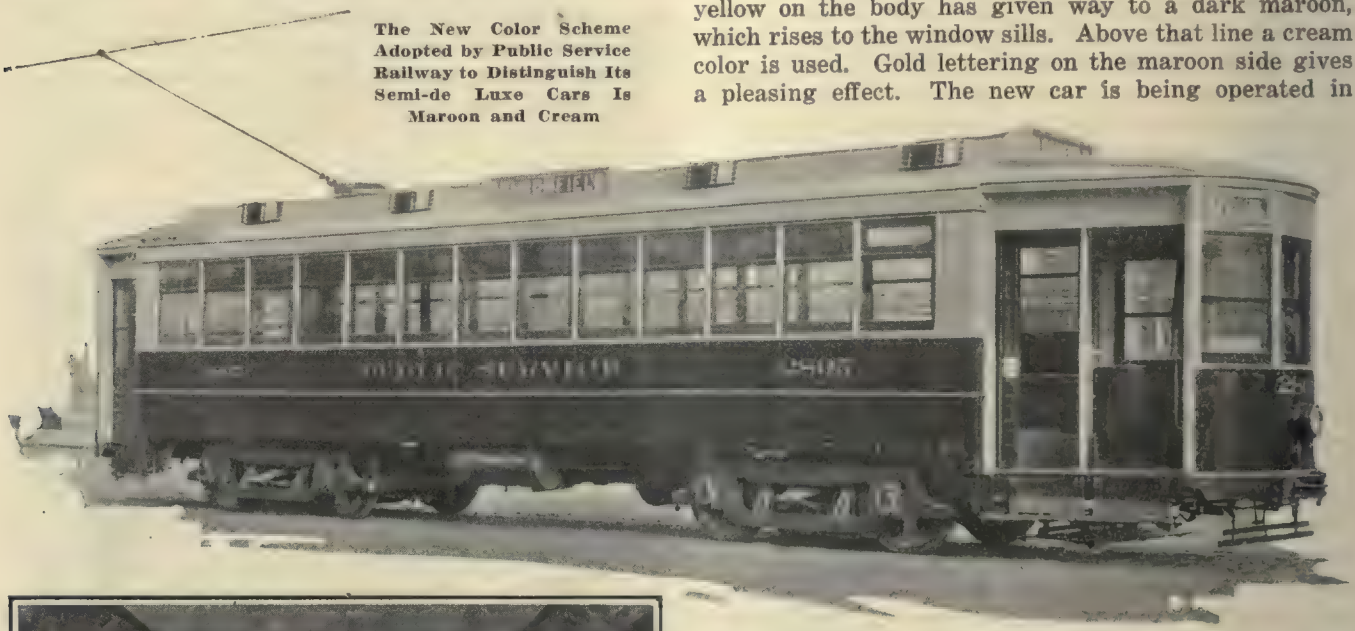
Railways in Indiana Operate 278 Buses

TRACTION companies in Indiana operate 278 buses, with a total passenger capacity of 6,447 people. These buses operate over routes traversing 1,093 miles. Of this mileage, only 62.6 is over city streets as auxiliary service to the street car lines. The rest of the mileage is over country roads between cities. The fares are fairly well standardized, ranging between 7 and 10 cents, excepting in two cases where rides are sold for 5 cents, and intercity charges averaging from 3 to 4 cents a mile. Six of the companies accept passengers willing to stand if all seats are occupied, but two others accept passengers only up to the seating capacity.

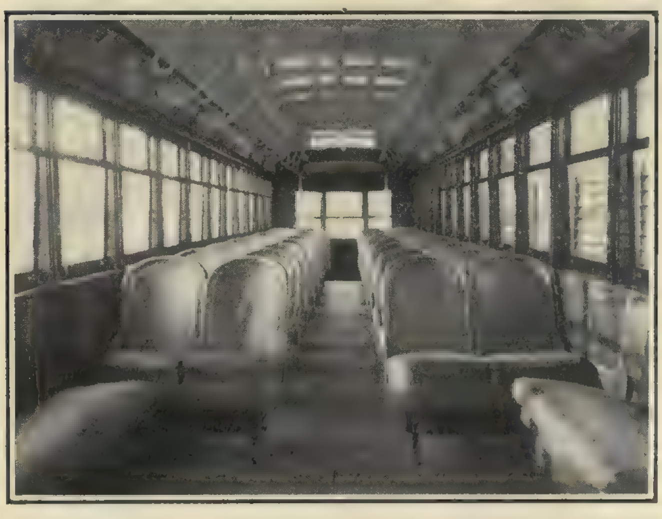
Bucket Seats Prove Popular

Public Service Railway Has Converted Latest City Car to Semi-de Luxe Type—New Exterior Color Scheme Permits Easy Identification

IMMEDIATE popular approval marked the introduction of a semi-de luxe car on the Bloomfield line of the Public Service Railway, Newark, N. J. For this service one of the latest city cars was completely renovated and repainted. Leather-covered individual bucket seats have replaced the old longitudinal cane-upholstered seats and the floor has been covered with linoleum.



The New Color Scheme Adopted by Public Service Railway to Distinguish Its Semi-de Luxe Cars Is Maroon and Cream



Double Bucket Seats Upholstered in Leather Have Replaced Longitudinal Cane-Upholstered Seats in This Car, with Which the Public Service Railway Is Trying to Attract Traffic from the Private Automobiles

Reconstruction was planned with the idea that the man who now drives his own automobile can be induced to ride the street cars if he is assured of the same degree of comfort as that to which he is accustomed. It is the hope of the operating officials of the railway that the remodeled car will prove sufficiently attractive in comfort and appearance to popularize the service and thus attract many new patrons who heretofore have used their own private transportation.

On each side are ten double bucket seats. A well about 12 ft. long is created at the front of the car by side seats holding six passengers each. The total seating capacity is 52. Spring hand straps of the type frequently found in rapid transit cars are provided on both sides of the car.

Side walls from the floor to the windows are paneled, the upper part being painted in imitation of hard wood. Iron and wood work in the car and on the front and rear platforms is painted a mottled brown and tan. The roof is painted white.

Outside the cars are easily distinguishable from the ordinary cars by the color scheme. Public Service yellow on the body has given way to a dark maroon, which rises to the window sills. Above that line a cream color is used. Gold lettering on the maroon side gives a pleasing effect. The new car is being operated in regular service at the usual fare. In addition to the one car already completed, ten others are being rebuilt in the same way.

Decreasing Congestion Losses

Dr. McClintock in Survey of Street Traffic in Chicago Discloses Many Interesting Facts—Improvements Are Suggested in Traffic Survey

A YEARLY saving of $27,000,000 can be made by a reduction of only 10 per cent in the delays affecting various types of traffic in Chicago. This is the extent of the economic burden that follows in the wake of traffic regulation, it is pointed out in one phase of the Albert Russel Erskine bureau's findings in that city alone. Experience with certain types of regulation in Chicago and other cities has demonstrated, the bureau points out, that where proper methods of control are applied the speed and volume of traffic flow can be increased from 25 to as much as 50 per cent.

The Erskine bureau, established in Harvard University for engineering research in street traffic, has completed in Chicago a twelve months survey that is one of the first scientific approaches to the solution of traffic problems confronting every American city. Undertaken at the request of the Chicago Association of Commerce and the City Council, the survey was in charge of Dr. Miller McClintock, director of the Erskine bureau, in co-operation with a committee of 80 prominent business men and city executives. An abstract of the Chicago survey appeared in the Jan. 8, 1927, issue of the JOURNAL.

"From the standpoint of movement of vehicles it is not an exaggeration to say that there are few cities in the United States that use even the most congested streets to more than 75 per cent of their capacity," declares Dr. McClintock. "The system of traffic control put into effect in Los Angeles increased the volume of traffic flow on the congested arteries more than 50 per cent and reduced expense and fatalities by more than 30 per cent. I know that by one move in Chicago it will be possible to reduce the number of trucks used in the delivery of merchandise and freight in the central part of the city by approximately 35 per cent."

Studies made by the Erskine bureau have brought out the fact that street transport plays a substantial part in the cost of living in every large city. Taking oranges, coal and potatoes as three staple commodities, it was found that drayage costs in the city, borne by retailer and consumer, ran from 25 to 50 per cent of the total freight rate from the original point of shipment.

Chicago's principal coal supply is in Illinois fields. Freight rates to Chicago are from $1.25 to $1.95 per ton. The consumer pays approximately 90 cents a ton in addition to the freight rate to cover the cost of trucking the coal from freight car to his coal bin.

Street accidents and fatalities add $600,000,000 to the national economic loss that can be reduced by modern traffic control, according to estimates of the National Conference on Street and Highway Safety.

Street congestion exacts a heavy toll from retail business establishments as well as adding to the cost of retail distribution, the Chicago survey has disclosed. Studies made in outlying business districts as well as in the central Loop area warrant the conclusion that where congestion occurs and interference results the volume of business has been reduced from 1 per cent to 20 per cent below that which would have been transacted with the automobile as a "business bringer" minus the factor of congestion.

Reports from other cities, supplementing the survey, indicate that a high percentage of all retail establishments in outlying shopping districts find that traffic congestion interferes in varying degrees with their volume of business. Information gathered by the Domestic Commerce Division of the United States Department of Commerce shows that in cities of more than 200,000 population 61 per cent of the retail establishments are affected by street congestion, 53.6 per cent in cities between 50,000 and 200,000 population, 46.5 per cent in cities between 10,000 and 50,000 and 32.9 per cent in cities from 2,500 to 10,000 population.

"From the standpoint of efficiency, and hence lower business cost, the problem of street use is the joint problem of merchandisers in the central district, merchandisers in the outlying districts and the purchasing public," declares Dr. McClintock.

Open Secrets of Operation in St. Louis

SOME of the many interesting activities going on continually behind the scenes in the operation of the United Railways, St. Louis, Mo., have been told in a 32-page pamphlet called "When St. Louis Moves." By means of interesting text and appealing illustrations, the peruser of this book sees St. Louis in the days of its cable cars and crinoline and follows its history up to the Twentieth Century de luxe cars and buses. Letting the patrons in on the daily and hourly doings of the railway system was decided upon as an antidote for the taking-for-granted attitude of many of the wonders of our daily life. The pamphlet was issued also as an invitation to the public to visit the shops and yards and note the operation of the various departments. Readers are assured that experienced members of "the army that never parades" will direct the curious ones.

The Readers' Forum

Further Comment on Chicago Bus Proposal

CHICAGO SURFACE LINES
CHICAGO, Jan. 12, 1927.

To the Editor:

The ELECTRIC RAILWAY JOURNAL deserves the highest commendation for the clarity and intelligence with which, in its issue of Jan. 1, it discusses editorially the bus proposal in Chicago.

As you so forcefully point out in this editorial, every authority on local transportation in the United States recognizes that the bus has an important function in supplementing electric railways, but when bus interests attempt to mislead the public into believing that satisfactory service in large cities can be given by buses alone they are injuring their own cause.

In consistently advocating co-ordination of rapid transit, surface and bus service the JOURNAL voices the best judgment and experience of the industry. Proposals to substitute buses for street cars in city-wide operation becloud the issue with false propaganda and are certain to be harmful to all concerned. G. A. RICHARDSON,
Vice-President.

MILLER-SCHORN RAPID TRANSIT SYSTEM
DETROIT, MICH., Jan. 11, 1927.

To the Editor:

We note the space which you have given Mr. Ritchie's views on the use of the motor bus in your issue of Jan. 1. The motor bus has a place in transportation, but it has certainly not yet been developed to a point where it can handle passengers as economically of space as do trolley cars.

While the per passenger street space of a double-deck bus may be calculated as less than that of a street car, the fact that it is not on a fixed right-of-way inclines the driver to pass from lane to lane in the street with a consequent greater actual use of the surface than does the trolley car and, moreover, this same facility makes it increasingly difficult for the other traffic on the street to gage their relative positions.

The bus has been advancing greatly in the past two or three years as to design and comfort, but in our opinion the most economical plan for handling and expediting mass transportation is the use of the trolley car for express purposes and the motor coach operating along the curb for local transportation on main arteries. The flexibility of the bus also makes it a very desirable vehicle for use in newer territory, the exact development of which is undetermined, and where transportation facilities, even at a higher base fare, are required.

We feel that your editorial has a common-sense ring that will strike a high average accord.

NICH. J. SCHORN.

Maintenance Notes

Commutator Slotting Saw Operated by Air Drill

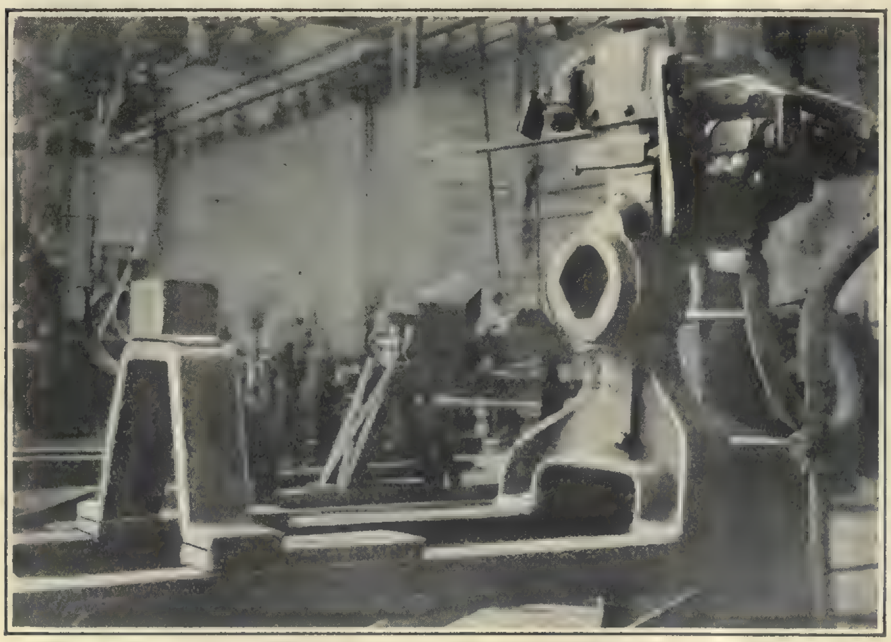
AN IMPROVISED commutator slotting machine for emergency use has been made up from an air-operated hand drill in the Interborough Rapid Transit Company's shop.

This slotting machine consists of a sturdy base upon which are mounted a stationary and a movable bearing for the support and the rotation of the armature. On top of the stationary bearing is mounted the slotting mechanism, consisting of a sliding base for horizontal motion, a slide for vertical motion and a hand air drilling machine with extended shaft and saw.

The air machine is securely fastened to the vertical slide and the saw shaft kept in alignment by a suitable bearing. A fiber shield is installed between the air machine and the saw to prevent the exhaust air from scattering the copper and mica dust. Directly over the saw is a suction hose to carry away copper and mica dust as it is developed during the slotting process.

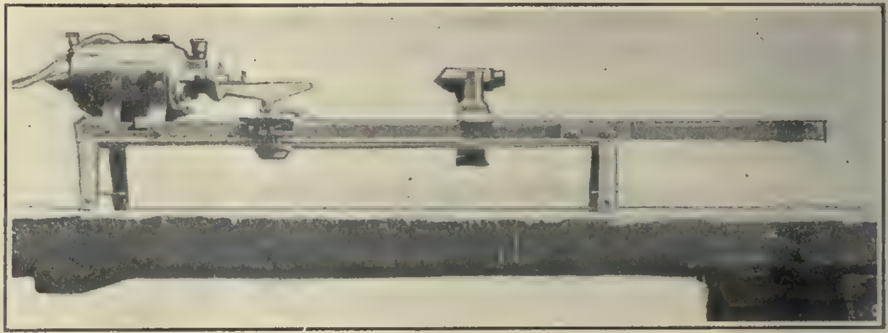
The depth of the slot is governed by the vertical slide, which is controlled by the hand wheel at the top. The movement of the saw through the slot is controlled by the horizontal sliding base hand lever shown in the illustration directly under the suction hose.

This machine has proved satisfactory for emergency use when for any reason the regular belt-driven slotters become inoperative.



Commutator Slotter Rigged Up from an Air-Operated Hand Drill for Emergency Use in Interborough Shop

Portable Lathe Efficient for Small Work



Portable Lathe Using Electric Drilling Machine as Source of Power

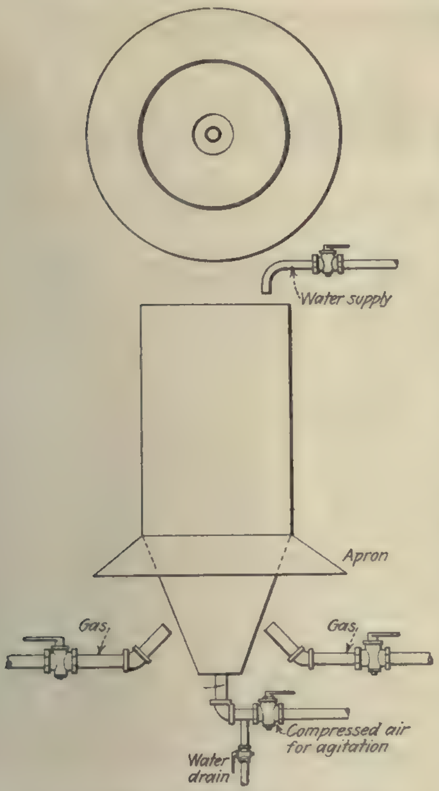
SMALL and light turning, grinding and polishing work is being done by the Lackawanna & Wyoming Valley Railroad, Scranton, Pa., on a portable lathe developed in the shop. This lathe consists of an electric drilling machine mounted on a 1¼-in. T-iron framework, together with an adjustable centering stand and tool rest. The drilling machine is provided with suitable chucks and centers for both steel and wood work and is rigidly bolted to the T-iron frame. The centering stand and tool rest move on top of the T-iron and are held rigid when desired by means of ½-in. machine bolts and wing nuts.

Due to its portability this small lathe has been found very useful throughout various parts of the shop and has eliminated the necessity of interfering with the production of larger lathes.

Rags and Waste Reclaimed for Shop Use

RAGS and waste used for hand cleaning purposes were always a rather large item in the annual shop budget of the Reading Transit Company, Reading, Pa., until H. E. Aldrich, master mechanic, devised a simple machine for reclaiming them. This material, heretofore refuse, is now deposited in an 18-in. x 18-in. x 36-in. galvanized iron tank, where it is boiled thoroughly in an Oakite solution. The cloths are then dried and returned to the stockroom for further use. This tank is located conveniently in the shop and is provided with gas and water supply, compressed air connection for agitation purposes and a suitable apron for

One of the "Follies of 1927" in railway manipulation,
Operation without full co-operation of your organization.



Cleaning Tank and Relative Location of Auxiliary Apparatus

confining the heat from the gas flame.

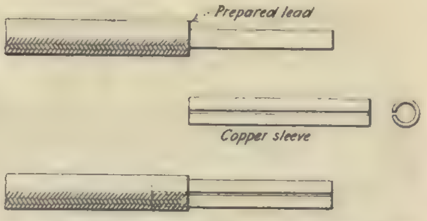
Since this shop-manufactured washing machine was put in operation the depositing of oil-soaked and greasy hand-wiping material in variout nooks and corners has ceased, with the result that the floors and pits present a very neat and clean appearance at all times.

Preventing Breakage of Leads at Ends of Sleeves

WHERE copper sleeves are installed over stranded leads the most frequent place of breakage is at the inside end of the sleeve where this adjoins the insulation of the cable. To overcome this trouble it is the practice of the Brooklyn-Manhattan Transit Corporation to shove the inside end of the sleeve back under the rubber insulation of the conductor so that sharp bending at the end of the sleeve will not occur. This has effectively reduced trouble from breakage of leads at the end of the sleeve.

An accompanying illustration shows the method used. In the top illustration a motor lead is shown ready to receive a soft copper sleeve. The center illustration shows the type of sleeve used and the bottom illustration shows the sleeve as applied to the cable. The sleeve is shoved back under the rubber insulation so as to bring the end of the sleeve flush with the end of the conductor. This requires a sleeve length somewhat longer than the bared end of the cable.

The sleeves are tinned by dipping them into a resin-alcohol solution and then into hot solder. They are then slipped onto the conductor and the end of the lead insulation is wet with water to prevent its catching fire when the sleeve lead is held in the hot solder. While the solder is working through the sleeve and strands of the conductor the rubber lining of the insulation is being softened by the heat. As soon as the rubber is soft enough the gloved hands of the workman can press the end of the sleeve against the side of the work table and so push the sleeve back under the rubber into position. Cooling then holds the sleeve firmly in position.



Method of Installing a Copper Sleeve Under Insulation, as a Protective Feature Against Breaking of Leads

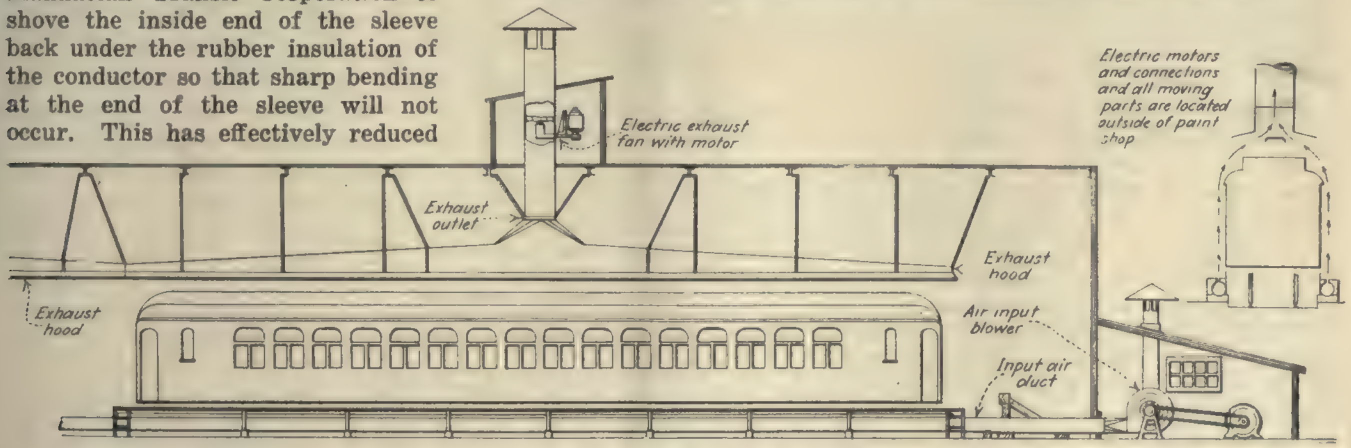
New Equipment Available

Exhaust System for Spray Painting

PROVISION for complete and safe removal of vapors due to spray painting without creating a draft in the shop or lowering the temperature is the salient feature of a special exhaust system for electric car and bus painting introduced by the DeVilbiss Company, Toledo, Ohio. With this system installed, it is claimed that lacquers and other spray materials can be used on any class of work with safety and satisfaction, and that the problem of gases is solved.

The accompanying illustration shows how the system is installed. It can be adapted to varying shop arrangements, according to conditions. Air ducts are included on either side of the track where car painting is done and a large exhaust hood is placed overhead. Air is supplied to the input duct from a blower, and a current of air rises alongside the car by passing from openings in the duct to the exhaust outlet overhead. The circulation of air is accelerated by having an exhaust fan in the outlet.

In operation the air current moving upward alongside the car carries off all gases and vapors without danger of their spreading throughout the shop. The upward current of air does not produce any serious deflection of the vapor from the spray gun, but removes the vapors completely and carries them up and out of the building. With this arrangement only the air which comes from the input air duct is removed from the room and no dust is brought in from outside. Electric motor fans and connections are installed outside the room.

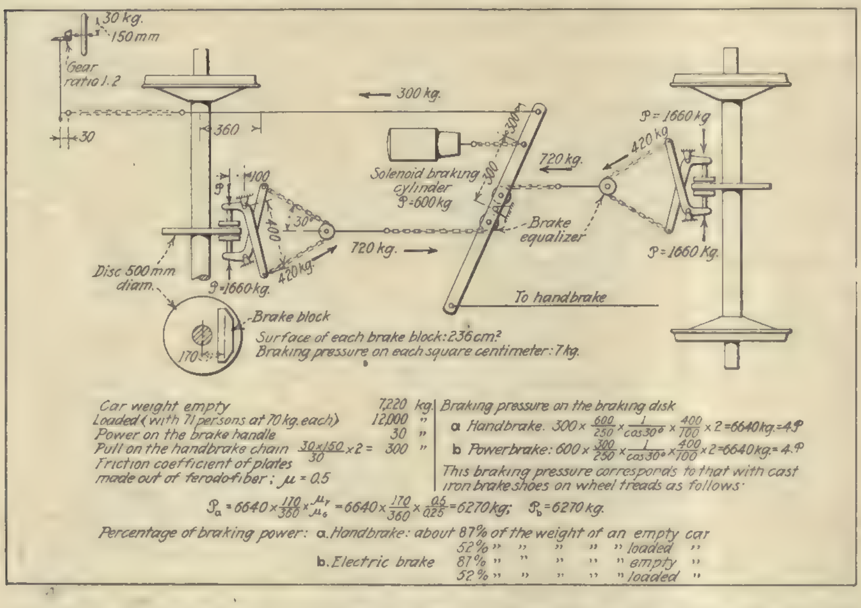

Electric exhaust fan with motor
Electric motors and connections and all moving parts are located outside of paint shop
Exhaust outlet
Exhaust hood
Exhaust hood
Air input blower
Input air duct

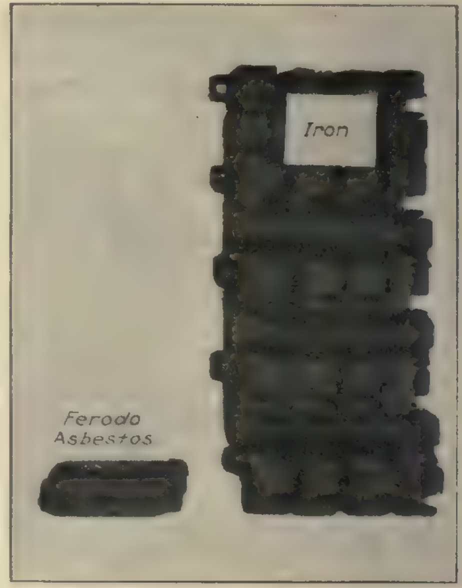
Special Car Painting Exhaust System

Axle Brakes and Heaters in Latest Berlin Cars

DURING the fall of 1926 the Berlin Street Railway put into operation 300 new trailers almost identical in exterior appearance to the 500 trailers of the 1924 series. In the new cars, however, a modification has been made in the brake, which now operates by pressure on each side of a disk on the axle by "plier" action, instead of on the inside of two disks by toggle action.

The chart indicates that the braking arrangement is very similar to that of the toggle joint and double disk arrangement, shown in the article in this paper for Feb. 13, 1926, except that pressure is applied on both sides of the disk and the area of contact distances is much less. Experience with the earlier brake showed that the wear on the brake blocks was much less than when wheel brakes were used, and one of the accompanying illustrations shows a year's consumption in the new type of brake blocks and in the wheel brake shoes formerly employed. This means, of course, a saving not only in material consumed but in time of changing brake shoes.


30 kg.
150 mm
Gear ratio 1.2
30
360
300 kg.
Solenoid braking cylinder
𝔓=600 kg
300
300
720 kg.
420 kg
𝔓=1660 kg
100
𝔓
400
30°
720 kg.
420 kg.
Disc 500 mm diam.
𝔓=1660 kg.
Brake equalizer
𝔓=1660 Kg.
To handbrake
Brake block
170
Surface of each brake block: 236 cm²
Braking pressure on each square centimeter: 7 kg.
Car weight empty 7,220 kg.
Loaded (with 71 persons at 70 kg. each) 12,000 "
Power on the brake handle 30 "
Pull on the handbrake chain $\frac{30\times150}{30}\times2=$ 300 "
Friction coefficient of plates made out of ferodofiber; $\mu = 0.5$
Braking pressure on the braking disk
a Handbrake. $300\times\frac{600}{250}\times\frac{1}{\cos30^\circ}\times\frac{400}{100}\times2=6640\,kg.=4\mathfrak{P}$
b Powerbrake: $600\times\frac{300}{250}\times\frac{1}{\cos30^\circ}\times\frac{400}{100}\times2=6640\,kg.=4\mathfrak{P}$
This braking pressure corresponds to that with cast iron brake shoes on wheel treads as follows:
$\mathfrak{P}_a=6640\times\frac{170}{360}\times\frac{\mu_r}{\mu_6}=6640\times\frac{170}{360}\times\frac{0.5}{0.25}=6270\,kg;\quad \mathfrak{P}_b=6270\,kg.$
Percentage of braking power: a. Handbrake: about 87% of the weight of an empty car
52% " " " " " loaded "
b. Electric brake 87% " " " " " empty "
52% " " " " " loaded "



At Left, Chart Showing Latest Type of Trailer Brake in Berlin. At the Right Is Shown the Difference in Brake Shoe Consumption, Per Car Per Year, with the Ferodo-Asbestos Shoes Used with the Disk Brake and Iron Shoes Used with a Wheel Brake

The car framing is of steel in standard structural Z, T and U shapes, riveted together with gusset plates. To avoid rust, all steel parts before being joined are thoroughly cleaned with a sand blast and are immediately dipped thereafter in a rust-protective liquid, like Subox. After completion of the car assembly the steel structures are once more painted, and where two steel surfaces lie against each other they receive a thick coating of white lead to fill out all crevices and keep out dampness. The finished car has a pleasing effect, being finished with stream lines.

> *Meet your schedules by better maintenance and keep your patrons from contracting the "hoof and mouth" disease.*

Those parts which are liable to frequent damage, such as car posts, side posts and side panels, are constructed so they can easily be replaced. Sections of the roof also can be replaced.

Silumin, a light metal alloy, is used for the seat frames. Light metal is also used for the step and door frame.

The roof is covered with Triolin. The same material is used within the car where the parts are liable to be kicked by the shoes of passengers, and as a floor covering instead of the customary wooden slats because it permits more thorough and easier cleaning. During rainy and snowy weather sawdust is scattered on the floor to absorb the moisture.

The car journals have roller bearings, as with the last lot of 1,000 cars purchased.

Motor cars on the railway system are heated, in part, by the current from the motors used in electrical braking and by the current which would otherwise be wasted in the starting resistances. The starting resistances in Berlin are carried on the car roof, and a set of electrical heaters within the car is arranged in parallel with a portion of these starting resistances so that either circuit can be thrown in and out by a changeover switch, without changing the ohmic resistance of the starting circuit. The position of this switch on the car is set at the power house by the engineering department and the transportation employees on the car are not allowed to move it.

MAIN DIMENSIONS 1925 MODEL, BERLIN TRAIL CARS

Length of car over buffers	10.46 m. or 34 ft. 4 in.
Length of car body	6.12 m. or 20 ft. 11 in.
Length of each platform	1.94 m. or 6 ft. 4 in.
Total height	3.22 m. or 10 ft. 6 in.
Wheelbase	3.20 m. or 10 ft. 5 ft.
Wheel diameter	720 mm. or 28 in.
Height of floor above pavement	775 mm. or 30½ in.
Number of steps	3 or 3
Weight of car empty	7.9 t. or 17,380 lb.
Weight of car loaded	12.8 t. or 28,160 lb.
Weight of each axle without journal boxes	0.5 t. or 1,100 lb.
Width of end exit door	800 mm. or 31½ in.
Width of end entrance	720 mm. or 28 in.

CAPACITY IN PASSENGERS

Seats	24
Standing room within car	17
Standing room on front platform	15
Standing room on rear platform	14
Total carrying capacity	70

DIMENSIONS OF CROSS SEATS

Width of each seat	492 mm. or 19½ in.
Depth of each seat	450 mm. or 17¾ in.
Spacing of seats	518 mm. or 20½ in.
Height of seat above floor	480 mm. or 19 in.

All car heaters are made of helical coils of resistance wire supported on porcelain cores, and the iron casings in which they are contained are lined with asbestos and grounded.

The number of heaters required per car is empirically determined so that an average temperature of about 10 deg. C. (18 deg. F.) over the outside temperature will be maintained.

Trail cars are not heated by this method but from the overhead system. In the trail car heater circuits a 220-volt lamp is put in shunt with part of the heaters, but only so that about 170 volts are on the lamp. This lamp acts as a visual signal to show whether the heaters are in circuit.

Association News & Discussions

Popularizing Electric Railway Service in Pittsburgh*

By J. B. Donley
Director of Public Relations
Pittsburgh Railways, Pittsburgh, Pa.

When the properties constituting the Pittsburgh Railways were returned to the owners following a receivership that had lasted from 1918 to 1924, it was realized that the public would expect greater service in schedules, comforts and convenience at once. To fulfill this expectancy the management acted to the limit of its capacity. By constantly improving the comfort of the cars, increasing transfer privileges and bettering the schedules, the company might eventually have reached success, but this alone would have taken such a long time as to be disastrous to the company. It was necessary to "sell" the company to the public at once. To accomplish this it was decided to resort to an experiment that was considered as daring as it was novel. We called it "broadcasting our accomplishments." It was not empty ballyhoo, for the company did have accomplishments to broadcast.

Orders were immediately placed for 225 new cars, this number being later increased to 378, the total expenditure being more than $3,000,000. Additional privileges that liberalized transfer use were affixed. Fares on fourteen of the shorter routes were dropped from three rides for a quarter to 5 cents. Nine district administration buildings were constructed and furnished at a cost of more than $70,000 each. These buildings contain assembly halls which may be used for entertainment and dancing. They are free to employees, civic organizations, and to the public generally. Since 1924, nearly 100 miles of track has been reconstructed, costing about $4,000,000.

Our outlets to give publicity to these improvements were many, although the medium of the newspapers was probably used most. On small signs, larger signs and large posters hundreds of messages have been put before the riding public since 1924. Subjects treated include car service, car equipment, information regarding places to visit, and Pittsburgh's great industrial activities. Announcements notified passengers that heat or lights would be turned on when requested, indicated where lost articles might be inquired for, and gave other information that indicated the company's interest in the public welfare.

Booklets have been published for out-of-town visitors regarding the various routes and their destinations. Pamphlets for distribution among civic organizations, outdoor advertising and window displays are other methods used. One of the largest factors in acquainting the public with the problems concerning the railways, as well as advertising the service, has been through addresses by the various officers appearing at every opportunity before clubs and community organizations throughout the Pittsburgh district.

We have reasons for thinking that we have not done our broadcasting in vain. The public in general has taken a great interest in what we are doing, and by its co-operative attitude is making it possible for us to do more. The traffic division of the Police Department, realizing that the public represented by the car rider is greatly affected by its activities, has done its utmost to facilitate the operation of cars. The traffic division heads are doing everything possible to improve conditions for the 80 per cent of the passenger traffic in and out of the downtown business district handled by the street cars. Fire chiefs have acted with full co-operation to relieve car riders from unnecessary delays by removing hose from car tracks when not actually in use.

COMING MEETINGS

OF

Electric Railway and Allied Associations

***Jan. 25*—New York Electric Railway Association, winter meeting, Hotel Commodore, New York City.**

***Jan. 26-28*—Association of Equipment Men—Southern Properties, Peabody Hotel, Memphis, Tenn.**

***Feb. 3-4*—Central Electric Railway Association, winter meeting, Toledo, O., Commodore Perry Hotel.**

***Feb. 4*—American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p.m.**

***Feb. 7-10*—American Institute of Electrical Engineers, annual convention, Engineering Societies Building, New York City.**

***Feb. 10*—Central Electric Railway Master Mechanics' Association, Toledo, Ohio.**

***Feb. 18-19*—Kentucky Association of Public Utilities, annual convention, Brown Hotel, Louisville, Ky.**

***April 26-29*—Southwestern Public Service Association, convention, New Orleans, La.**

***Oct. 3-7, 1927*—American Electric Railway Association, annual convention, Public Auditorium, Cleveland, Ohio.**

Measuring the Accomplishments

As we saw it, the big job was to get the public to realize the value of the street railway to the community and to make the facility more useful and more appreciated. That this has been accomplished may be realized by comparison with the figures of last year and of the last year of the receivership, 1923.

In 1923, 330,000,000 rides were taken by the street car patrons of the Pittsburgh district. In 1926, more than 400,000,000 rides were taken. To carry these 70,000,000 additional passengers it has been necessary to operate 1,500,000 more car-miles in 1926 than in 1923. However, the most significant point is that for these 70,000,000 more rides in 1926 the passengers paid $800,000 less money. This is a practical demonstration of what it has meant to increase the usefulness of a public utility and at the same time decrease fares.

The average car ride in the Pittsburgh district for 1926 cost 5.35 cents, while in 1923 it was 7.6 cents. At first glance, this would seem to indicate that the Pittsburgh Railways is playing a losing game, but along with the policy of increased usefulness at decreased fares, there has also been the policy of increased economy and elimination of waste. Through the efforts of the trainmen, shopmen and other workers a reduction of costs has resulted despite the large number of additional miles operated.

The greatest contributing agency to reduced rates, however, has been the weekly pass. This pass permits patrons to ride an unlimited number of times on all cars within the first fare zone for $1.50 each week. Its main features for gaining popularity are its transferability and its elimination of the bother of buying car checks, asking for transfers, and making change. Its sales have grown steadily from a start of about 35,000 in June, 1925, until now they have mounted to more than 60,000 each week. In practical "popularizing" of the street cars, I think that this weekly pass deserves more credit than any other single factor.

In spite of all that has been done in the past three years, however, the greatest problem still lies unsolved; that of filling the empty seats in the cars, and utilizing the empty cars that are stored in carhouses during off-peak hours. If more money could be secured from additional traffic to justify additional operations, these operations in turn would develop traffic through greater frequency of service. It is in the solving of this problem that ultimate welding of the good will of the public will be accomplished by the railway management, and the greatest opportunity to gain this end lies in the achievement of a maximum usefulness of the properties.

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*Abstract of a paper presented before the Midwest Electric Railway Association, Tulsa, Okla., Jan. 7, 1927.

After all, understanding on the part of the patrons, public officials and railway workers means everything. We might adjust fares to a scientific nicety or build a car which is more economical, efficient and comfortable than any ever designed, but unless we understand each other enough to work shoulder to shoulder, unless we of the railways can convince the public of our sincerity and honesty of purpose, then all the efficiency in the world will not secure for us the friendly public relations which we desire, and which we must have if we are to go forward instead of backward.

Motor Vehicles Feed Rails, World Congress Is Told

GROWTH of the automotive industry, its problems, and its relation to electric railways, steam railroads and waterways was the subject of discussion at the third World Motor Transport Congress held in New York, Jan. 10-11, under the auspices of the National Automobile Chamber of Commerce. More than 400 delegates from 52 countries attended.

Thomas H. MacDonald, chief of the United States bureau of public roads, told of the service rendered by motor transportation in feeding the rail lines of the country. "Out of 125,000 communities in the United States," he said, "some 45,000 are still actually not on rail lines, but motor transportation has placed them in direct touch with these. Thus motor transportation has not only linked together all the communities of this country but it has made immediately available to one-third of them rail transportation that they had never enjoyed before."

J. Walter Drake, Assistant Secretary of Commerce, declared that motor transport "by linking remote communities with rail lines had enormously increased the business of both electric and steam railways." Much the same idea was voiced by Cyrus McCormick, Jr., vice-president International Harvester Company, who declared that rail and motor transport were "complementary methods of transportation rather than competitive."

Co-ordination of facilities as a means of solving the city traffic problem was urged by John A. Ritchie, president Yellow Truck & Coach Manufacturing Company, in a speech prepared by him and read in his absence by Frederick T. Wood, president Fifth Avenue Coach Company, New York. "In the study of traffic problems," he said, "nothing has impressed me so greatly as the extraordinary complexity of interests involved." All of these, he declared, must be co-ordinated in unselfish co-operative effort, or there can be no solution. Fact-finding bodies must first be appointed, he said, to approach the problem without political prejudice and their work should not be allowed to become weakened by consideration of suggestions entirely experimental in their nature.

Traffic congestion is being held responsible by some automotive manufacturers for a noticeable falling off in private automobile sales in certain cities, according to R. H. Grant, vice-president Chevrolet Motor Company, who presided at one session and furnished introductory remarks preceding Mr. Ritchie's paper.

Entertainment at C.E.R.A. Meeting—Constitution Changes

PLANS for entertainment at the winter meeting of the Central Electric Railway Association, which will be held at the Commodore Perry Hotel, Toledo, Ohio, have been announced by James H. Drew, chairman hotel and arrangements committee.

On Thursday, Feb. 5, there will be a sightseeing bus trip for the ladies, starting from the hotel at 10:30 a.m. After luncheon there will be a matinee at one of the local theaters.

It is also expected that all visiting ladies will attend the annual dinner to be held at the Commodore Perry Hotel on Feb. 3, beginning at 6:45 p.m. The dinner will be followed by dancing.

The entertainment will be in charge of H. R. Roudebush, secretary and treasurer of the Community Traction Company, and a committee of local ladies.

The manager of the Commodore Perry Hotel states that rates for rooms will range from $3.50 to $7 for one person in a room, $5.50 for two persons in a room with full-sized double bed and $8 and $9 for two persons in a room with twin beds.

Consideration of two amendments to the constitution and one amendment to the bylaws of the association will be given at the annual meeting. The amendment to Article IV, Sec. 1, of the constitution has the purpose of expanding the membership of the executive committee, while the amendment to Article X deals with the method of adopting amendments to the constitution. Article IV, Sec. 2, of the bylaws would be amended to make the dues of supply members $15 per year, effective with the calendar year 1927.

New York Meeting and Dinner on Jan. 25

SPEAKERS at the dinner of the New York Electric Railway Association on Jan. 25 will be the Governor of New Jersey, Hon. A. Harry Moore, and Dr. W. Warren Giles, a constructive humorist. Dr. Giles spoke at a meeting of the New York association two or three years ago and impressed his hearers most favorably with his wisdom and humor.

The committee in charge of the program for the day sessions has provided an added attraction, besides the papers announced last week, by the acceptance of L. S. Storrs to give some observations of his recent European tour. The committee also announces the formal discussions to follow the paper by H. K. Bennett on "Accident Prevention" by the gentlemen named below:

F. B. Wright, director publicity New York Railways.

A. L. Hodges, assistant to vice-president and general manager Brooklyn City Railroad.

C. P. Segard, assistant secretary Third Avenue Railway.

A. D. Brown, claim agent New York State Railways, Syracuse, N. Y.

R. R. Hadsell, general superintendent transportation New York State Railways, Rochester, N. Y.

Discussion on the paper by Samuel Porcher on "A Modern Inventory and Purchasing Methods" will be by R. C. Harris, general storekeeper Pennsylvania Railroad.

The meeting is at the Commodore Hotel, New York City.

American Association News

Unification of Car Design

DECISION was reached as to the work to be undertaken by the committee on unification of car design during the coming year and a preliminary report was drafted at a meeting held at association headquarters, New York City, on Jan. 6. Those present at the meeting were H. H. Adams, chairman; J. A. Brooks, C. A. Burleson, A. L. Kasemeier, John Lindall, Victor Willoughby, W. L. Barclay, Jr., representing W. J. Clardy and C. W. Squier, representing Charles Gordon.

Replies received from numerous railway officials commenting on the report of the committee on essential features of car design which was sent out in June, 1926, were gone over in considerable detail by the committee. It appeared that to further the use of the car design submitted it is desirable for the committee to act as a clearing house for questions and for solving problems which would come up in trying to adopt the general dimensions proposed to specific cases where new equipment was being purchased. The committee decided to extend its services in this connection. Various railway officials who are considering purchase of new cars are invited to submit their problems to the association, and the work will then receive special attention by the committee.

It also appeared desirable to use some standard designation for the designs of cars submitted by the committee on essential features of car design. The committee recommended that cars covered in the report be designated as A.E.R.A. city car design and A.E.R.A. interurban car design. A progress report that was drafted by the committee will be sent through the regular channels so as to be distributed as soon as possible.

The News of the Industry

Suggestion Offered for Seattle Railway's Solvency

Several suggestions for placing the Seattle Municipal Railway, Seattle, Wash., on a solvent basis are offered in a report to the City Council by W. J. Clardy, railway engineer, employed by the Westinghouse Electric & Manufacturing Company, which recently offered to finance Mr. Clardy's survey of the municipal railway situation. He suggests operating the street railway either as an industry in which the car riders, who provide the revenue, are given first consideration, according to fundamental principles of business, or operate it for the convenience of all citizens whether they are car riders or not, but not attempting to do both. He further recommends placing the railway department under centralized management to eliminate the conflicting functions of the superintendent, the Mayor and the City Council.

Mr. Clardy's recommendations for operation methods coincide with plans already recommended by D. W. Henderson, superintendent of the railway, and Clark R. Jackson, superintendent of the utilities department, and include rerouting of cars as put into effect recently. Other suggestions include installation of loading platforms at heavy loading points and providing better means of marking all safety zones, putting into effect a "pay-enter" inbound and a "pay-leave" outbound fare collection system to decrease the time required to collect fares, and promoting the sale of tokens by local business institutions to reduce change-making on cars. Of the financial phase, Mr. Clardy declares that the railway is not handling a sufficient number of passengers per car-mile.

St. Louis Seeks 8-Cent Fare Suspension

Suspension of the 8-cent street car fare schedule for the United Railways, St. Louis, Mo., which Receiver Rolla Wells has notified the Missouri Public Service Commission will be put into effect on Feb. 7, has been asked by the city of St. Louis in a petition filed with the Public Service Commission. The city's counsel contends that an audit of the company's books and records ordered by the commission on June 14, last, soon will be completed and that the commission should not permit any increase in fares until the results of the audit are known. "The audit is very material to a proper and final determination of the issues," the city's petition states, "and the city believes the commission cannot reach a fair and intelligent decision in this matter until it has before it the results of operation and of the additions to the property as they will be revealed in the audit."

Receiver Rolla Wells on Jan. 8 notified the state commission of his determination to increase the fares for adults from 7 cents to 8 cents effective Feb. 7. Should the state commission suspend the schedule as the city requests, the company may either await the results of the commission's decision when the results of its audit are revealed or it can go into the federal court pleading that the present rate of fare amounts to confiscation of its property. Should Receiver Wells take the latter course the city will make the defense that the case is in the hands of the state commission, from which an early decision is expected.

The first petition of Receiver Wells for increased fares was filed with the state commission on June 14. The company seeks to charge an 8-cent basic fare, but plans to sell two tokens for 15 cents. The city in opposing the increase has contended that the company is operating its city lines profitably and that the city car riders should not be expected to carry the burden of maintaining certain unproductive lines which are operated by the company in St. Louis County.

Committee Hearings on Chicago Settlement Plans

Corporation Counsel Thinks Blair Billion-Dollar Plan Impossible of Consummation—Further Action on It Unlikely Now—Messrs. Lisman and Harlan Discuss the Lisman Plan

WITH the six months extension of the expiring Chicago Surface Lines franchises approved by the local transportation committee and company officials and practically certain of acceptance by the sole remaining arbiters, the federal court for the north side lines and the City Council for the city, sessions of the local transportation committee during the week ended Jan. 21 were devoted almost entirely to scrutinizing the three traction settlement plans now before it.

Because the tremendous financial burdens which it would place upon the city would entail amendments to laws and possibly to the state constitution, the $1,000,000,000 unified transit plan recently made public by Henry A. Blair, president of the Chicago Surface Lines and co-receiver of the north and west side lines, was declared to be practically impossible of fulfillment by Corporation Counsel Francis X. Busch, when the plan came up for initial hearing at the local transportation committee meeting on Jan. 17.

COST TO CITY CONSIDERED STAGGERING

Differing from the pending surface and elevated line ordinance by virtue of its greater scope, the Blair plan, an abstract of which appears elsewhere in this issue, proposes to extend the existing surface, elevated and bus systems of the city into a single gigantic corporation, representing by 1950 a gross investment of $1,003,626,000. Of this huge total, the company would invest $563,274,000, while the city would be required to invest approximately $440,000,000 for subways and elevated lines. The average fare under the scheme would be 7.35 cents, with a maximum fare of 7.71 cents in 1933 and a minimum fare of 7.06 cents in 1950.

Some of the flaws in the financial plan were pointed out by Mr. Busch, when E. J. McIlraith, surface lines engineer, who explained the Blair proposal to the Aldermen, intimated that it was based on the assumption that of the total costs for subways and elevated lines to be built by the city under special assessment, 75 per cent would be raised by special assessments of the property owners and 25 per cent supplied by the city by general taxation as public benefits.

In support of his belief that this assumption is fallacious, Mr. Busch referred to other public improvements in which the city's share almost invariably had exceeded 60 per cent of the total cost. He said:

> Even if we could carry out the program on a 50-50 basis the city would have to raise $220,000,000. Under the present debt incurring limitation, which is now virtually exhausted, it would be impossible for the city to raise the $440,000,000 necessary to defray its share of the costs under the proposal.

Mr. McIlraith's answer to this objection was to urge that the assessed valuation of property be increased.

It was also brought out during the hearing that no compensation to the city nor rentals for subways built by the city had been taken into consideration in reckoning rates of fare. This additional outlay, it was indicated, would further increase the rate of fare contemplated.

Mr. Busch concluded his indictment of the plan with the assertion that the new organization would want a 7½ per cent rate of return, while the return to the elevated lines is now less than 3 per cent and that to the surface lines just a trifle over 6 per cent.

Although no direct statements were made by traction or bank officials who attended the meeting as to the status of negotiations toward consolidation of properties involved in the discussions, Weymouth Kirkland, attorney for Mr.

Blair, told the committee that the rate of return to the new company as well as the type of franchise to be offered by the city must first be determined before consolidation could be agreed upon. The plan would require enabling legislation, he said, first, to permit the surface and elevated lines to consolidate; second, for authority to issue terminable permits and, lastly, to enlarge the city's power over special assessments.

Asked by Alderman Donald S. McKinlay why the two systems could not tentatively agree to consolidate, Albert W. Harris, president of the Harris Trust & Savings Bank and member of one of the Surface Lines bondholders' protective committees, declared that "there must first be an agreed valuation and rate of return." "On Feb. 1 the bondholders will assume control of the Chicago Railways," he said. "The quickest way to get a merger is a foreclosure and sale."

In urging the passage of terminable permit legislation, Mr. Harris remarked that the poor market for electric railway securities today is primarily due to the short-term franchise.

While no criticism was offered on the physical features of the Blair proposition, as a result of these unexpected obstacles and disagreements over financial details, many of the Aldermen bitterly denounced the belated effort to rush through a settlement. For this reason, it is unlikely that any further action will be taken in the matter for some time to come.

REVISED LISMAN DRAFT DISCUSSED

The Lisman plan, a revised draft of which was presented to the Aldermen in the form of an ordinance on Jan. 10, likewise came in for some unfavorable criticism by Corporation Counsel Busch at a committee hearing on Jan. 15.

Mr. Busch pointed out that while the Lisman ordinance was not contingent upon legislation as is necessary to make the surface-elevated lines ordinance valid, many of its provisions might be changed or nullified by the Illinois Commerce Commission.

Chief among these provisions which might come under the jurisdiction of the commission, which it has been sought to avoid, are the plans for amortization of the properties, the barometer funds for fares and the rates of return, he declared.

A clause in the ordinance providing for the immediate expenditure of $55,000,000 for track extension, the funds to be obtained by a bond issue for that amount, was condemned on the ground that the commission might exercise its legal right to disapprove the bond issue.

In replying to this charge in a formal statement made public the following day, Frederick J. Lisman, author of the plan, said that he was fully cognizant of the power of the Illinois commission to pass on security issues and other matters and that he did not propose to request their approval of anything which was "improper or unreasonable." He explained that under the Lisman plan car riders would be asked to provide only about 6 per cent on a reasonable valuation, while the average return permitted utility companies by the courts and commissions is at least 8 per cent on the capital invested. He added that with a charge so moderate "we have nothing to fear in the way of unfavorable rate decisions."

Final action on the Lisman ordinance has been postponed to give Mr. Harlan an opportunity to submit a brief on its advantages and a detailed financial set up.

Service Survey Started in Philadelphia

Transit Company Says City-Center Congestion Is Limiting Factor Fixing What It Can Do

The Philadelphia Rapid Transit Company, Philadelphia, Pa., in a letter to Public Service Commissioners Beamish and Benn, in charge of the Public Service body's investigation of transportation facilities in Philadelphia, has acknowledged that its service had become "increasingly deficient," but attributed that condition to city-center traffic congestion. The letter was written by Thomas E. Mitten, chairman of the executive committee. It reads as follows:

> P.R.T. welcomes the investigation of its service now being undertaken here under the direction of your experts, headed by Dr. Snow, because it will afford the greatly desired opportunity to have the real causes of the interrupted—and consequent unsatisfactory—service impassionately analyzed, with adequate remedies recommended to be forthwith made effective.
>
> P. R. T. has all along acknowledged its present service to be becoming increasingly deficient, but claims the causes to be beyond its power of control and that its present service is necessarily limited by the number of cars it can get through the city-center district during the hours of most congested traffic.
>
> This is a matter which can be made subject to determination through the investigation now under way, as is also the truth or falsity of the charge that P. R. T. did actually decrease its street car service to drive its prospective passengers into its higher-fare motor buses and taxicabs.
>
> Observing persons already know, from what they see every day while riding on the cars, that regularity of service is made impossible by the use of city streets as now allowed in way of motor parking and other permitted forms of traffic interruption, but the charge that P. R. T. so misuses its powers as to drive its passengers from the street car to the motor bus and taxicab—for sake of the higher fare—is a falsehood that is not easily overcome and one which we would, therefore, respectfully ask that your examining experts give first attention.

The commission, in reply, said:

> The Public Service Commission today (Jan. 13) commenced its co-ordinated investigation of the services being rendered by the P. R. T. and buses for these services. This investigation will, from time to time, call upon the officers and employees of the P. R. T. for information and records. The commission acknowledges your tender of co-operation.

At the outset of the survey Commissioner Beamish invited every individual car rider or business organization with suggestions to make with respect to service to mail their ideas to the commission.

It is planned to have the physical survey well under way before the arrival of Charles C. McChord, former chairman of the Interstate Commerce Commission, who has been engaged by the state body to study and submit recommendations on the legal and policy phases of the survey.

Petitions for Commutation in Schenectady

Public Service Commissioner George R. Lunn on Jan. 7 held a hearing on the petition of the Schenectady Railway for permission to issue an additional commutation ticket based on the rate now in effect in interurban territory, by adding the local fare rate in Schenectady, Albany and Troy, N. Y., to the rate from the first interurban point outside the cities. The new commutation will be optional with the purchaser, the one in use at present being continued, by which the user pays his fare by commutation ticket to a city line and a cash fare within a city.

If he desires to save himself the bother of paying a cash fare he can purchase the new commutation ticket, which will permit him to ride within the three cities without paying the cash fare. Tickets are good for 50 rides within 30 days and unused or partially used tickets will be redeemed by charging full rate for the number of tickets used.

It is proposed to issue two forms of commutation tickets, one as at present, good from interurban points to a city line, not including the city fare, and the other good from interurban points to include the city fare with the interurban fare. The purchase of either ticket is optional to the passenger.

183 Trains in Chicago Loop in Rush Hour

What is believed to be a world's record in movement of cars past a given point was established by the Chicago Rapid Transit Company on Saturday morning, Jan. 8, when a total of 1,017 cars, comprising 183 trains, entered the Loop during the rush hour.

This is the third time in the past three months that the Rapid Transit Lines have set new records in transporting the throngs of workers to the Loop during the morning rush period.

On Oct. 7 a total of 989 cars arrived in the Loop during the morning rush hour. This number was raised to 992 on Dec. 4 and to 996 on Dec. 31.

Bernard J. Fallon, vice-president in charge of operation, said that the company would continue its efforts to better "the world's record."

Would Advance Centralia Rates

The Centralia & Central City Traction Company and the Centralia Traction Company of Centralia, Ill., have filed schedules with the Public Service Commission in which it is proposed to advance railway rates. Under the new scheme the rates would be as follows:

> Adult Cash Fares: Single cash fare, 10 cents.
>
> Ticket Fares: Three tokens or tickets 25 cents.
>
> Children's Fares: All children under six years of age may ride free when accompanied by an adult.
>
> Cash Fares: Children six to twelve years of age, single cash fare, 5 cents.
>
> Ticket Fares: Six tokens or tickets for children from six to twelve years of age, 25 cents.

The present rate for adults is 6 cents and for children 3 cents. Transfers would be issued from one line to the other as under the present arrangements.

Discussion Continues in New York

Nothing Tangible on Transit Has Been Done Lately in New York, Not Even on Buses

There has been no diminution recently in the discussion of transit matters in New York. Chairman Dahl of the Brooklyn-Manhattan Transit Company has issued several more open statements on the matter, Mayor Walker has reiterated his previous stand with respect to the bus matter and men prominent in public life have discussed the matter, notably before the National Republican Club. This last forum was held on Saturday afternoon, Jan. 15, and the remarks were broadcast over the radio.

The latest of Mr. Dahl's letters are known as Nos. 9, 10, 11 and 12. They go into various matters in detail, but letter No. 12 deals more particularly with the matter of the repetition of early mistakes in the prosecution of the city's present transit policy, the matter of why competitive methods fail and the possibility of the city saving $150,000,000 by proper regard for co-ordination and the utilization of facilities not now effectively used. The other communications by Mr. Dahl include a letter to the editor of the *World* and a report on the rapid transit situation in New York by George F. Swain and Parsons, Klapp, Brinckerhoff & Douglas, in which they express the belief that "the best unified transportation system should include not only subway and elevated lines but surface lines and buses as well." "Many large cities are unifying their transportation systems," say the engineers, "but only New York City appears to be following the opposite policy."

Mayor Has Just Begun His Fight

On Jan. 20 the Mayor indicated that he had just begun his fight to put buses on the streets as quickly as possible. To that end he has postponed indefinitely his projected trip to Cuba, on which he was to have started on Jan. 22, and announced his intention of getting a vote at next week's regular meeting of the Board of Estimate on the question of having the Board of Transportation prepare contracts for bus franchises for Manhattan, the Bronx, Brooklyn and Queens. The Mayor indicated after the meeting of the board on Jan. 20, at which he failed in a similar attempt, that he expected to have a majority of the votes on the board to pass his resolution next week, but was still short of the twelve votes necessary for the actual award of the franchises.

The speakers at the meeting before the National Republican Club were Colonel Sheppard and Messrs. MacAneny, Curran and Quackenbush.

Mr. MacAneny, former chairman of the Transit Commission, said that the lack of settlement of the transit problem has held back the growth of the city for many years. The traffic today was double what it was in 1913. Even the subways as they are today have increased the value of property 50 per cent. The extensions of the old lines were more important than the building of new disconnected units. At the present time the branch lines were developed to better advantage than the trunks. The city was suffering from a lack of trunks. At present there were seventeen branches or streams of traffic flowing through the two existing trunks north and south on Manhattan. While these were used to capacity and sometimes to more than capacity, the branch lines were used not to exceed 65 per cent at the rush hour and some as low as 35 per cent.

The Transit Commission was formed by the act of 1921 and four months after it began to function proposed a plan opposed by former Mayor Hylan. Instead, the old administration went ahead with an independent system, one unit of which on 53d Street, according to the present plans, would cost $112,000,000 and would be utterly useless without the extension to Jamaica, and no immediate plans had been developed for this extension. Therefore it will be most improvident to construct this short unit. The independent lines were estimated to cost $625,000,000. The construction of the Eighth Avenue subway so far was such that it can be linked into the other tubes and be made an additional trunk unit. If the remaining contracts were granted the city would be committed to an independent system, much of the cost of which will have been wasted if the line is not co-ordinated with the present systems.

By co-ordinating the transit lines with the existing systems $150,000,000 can be saved in subway construction and an additional $150,000,000 for equipment would be transferred from city funds to company funds, since the companies are obligated to furnish this equipment when the tubes are leased.

Mr. Quackenbush, who is general counsel for the Interborough Rapid Transit, said the first mistake was made when the two systems were started. The present Interborough Rapid Transit Company for ten years has performed an enormous task without adequate funds. The 5-cent fare of 1913 has depreciated to a 3-cent fare today. The travel on the system has increased tremendously and in one 24-hour period just previous to Christmas 3,933,000 passengers were handled in one day.

No Parking Passes in Philadelphia

The City Council of Philadelphia, Pa., passed unanimously on Jan. 13 the drastic ordinance banning parking in the central section of the city, and later it was signed by Mayor Kendrick. Director of Public Saftey Elliott explained that he would carry out his promise that the measure should be taken as of an experimental nature. He said he would meet the public safety committee of the Council once a month and report on the progress of the ban. If after a reasonable time it was demonstrated that enforcement was not possible, he would then ask the Council to amend the law.

The provisions of the bill were outlined in the ELECTRIC RAILWAY JOURNAL, issue of Jan. 8, page 93, and are referred to elsewhere in this issue.

Denver Fare Case Argued

Supreme Court Hears Contentions of Appellee and Appellant in Question of City Regulation of Fares

Questions involved in the regulation by a city of fares to be charged by an electric railway are before the Supreme Court of the United States in the case of City and County of Denver, Appellant, vs. E. Stenger, as receiver of the Denver Tramway, Appellee, No. 112.

Argument was commenced on Jan. 11, 1927, by Thomas H. Gibson for the appellant and was continued on Jan. 12 by Mr. Gibson and Mr. May. Gerald Hughes argued the case for the appellee.

The appellee contends that this is a suit which is in essence a rate suit, involving an averment of confiscation and the deprivation of property without due process of law. Appellant contends that, instead, the petition filed by the receiver "concerning fares and operating conditions" was an ex parte proceeding which sought the advice and direction of the trial court and prayed that it might instruct and authorize the petitioner to assert certain rights which he claimed to exist in the tramway and himself as receiver.

It was said the only theory on which the appellee based any claim to right to an increased fare was that of an alleged confiscation of the property of the tramway in violation of the Fourteenth Amendment of the Federal Constitution and similar sections of the Constitution of Colorado, and that this theory is based upon the following assumptions:

1. That the ordinances upon which the only alleged property rights of the Tramway which the appellee claims to have been violated are based do not amount to contracts in respect of fares.
2. That even if they were contracts they had been waived by the City Council in attempting to aid the tramway company in allowing increased fares in time of stress.
3. That the mutual obligations of the parties have been destroyed by the regulatory power exercised by the city.

It was contended for the appellant that the trial court was without jurisdiction to enter any other than a decree of dismissal. It was averred that the court erred in rejecting the city's expert testimony on valuation, thereby sustaining the company's exceptions and objection to the competency and qualifications of the city's chief expert witness.

The position of the appellee was that the final decree of the District Court, so far as the questions of jurisdiction, of confiscatory fares and other matters passed upon by the District Court of Appeals are concerned, is based on and follows the mandate and opinion of the Circuit Court of Appeals and that this court is without authority on this appeal to review the pending case in such respects.

And further it was stated that if the question of a 5-cent contract were before the Supreme Court as one of first review, independent of the Circuit Court of Appeals' decision, that the Supreme Court must hold that there never was such an enforcible contract which would justify confiscation and that subsequent regulation by the city has in any event displaced such alleged contracts.

Increased Fares in Watertown

The Public Service Commission on Dec. 31 granted the petitions of the Black River Traction Company and the Watertown Transportation Company for permission to increase electric railway and bus fares in Watertown, N. Y., and discontinue the sale of round-trip tickets between Watertown and Glen Park.

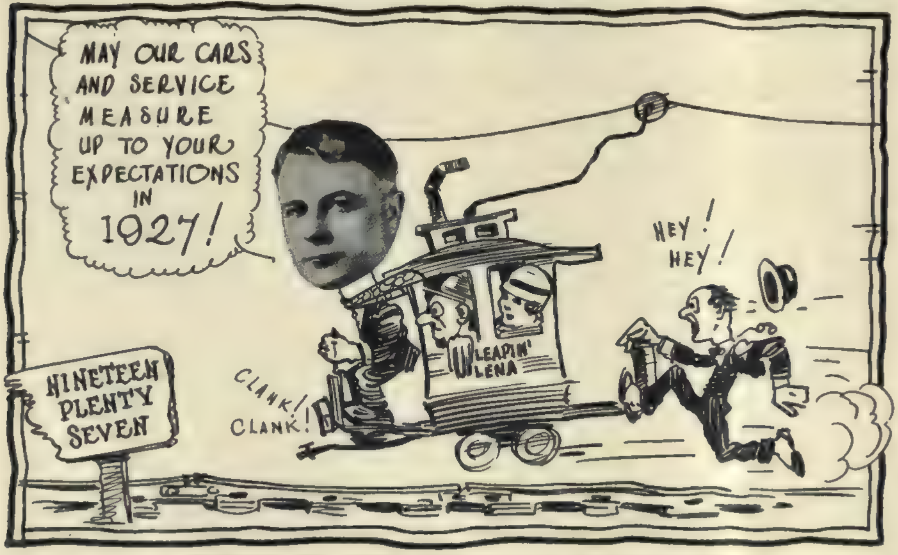
Fares are now 7 cents with sixteen commutation tickets for $1. Fare to Glen Park is 10 cents and round-trip tickets 15 cents. The orders provide that a cash fare of 10 cents may be charged for a continuous ride within the city until Dec. 1, 1927; also that commutation tickets shall be sold at the rate of seven for 50 cents, making the ticket fare 7⅐ instead of 6¼ cents and entitling the holder to the same privileges as cash fare except a transfer charge of 3 cents to the Washington and Franklin Streets and the Arsenal and Mill Street lines. At State and High Streets transfers will be given to the High and Pearl Streets line without charge. The order relating to the Glen Park line authorizes the discontinuance of round-trip tickets, making the fare 10 cents each way.

The original franchises granted these companies contained limitations as to fare within the city. These limitations were waived by the Common Council on Oct. 18, 1926, permitting an increase until Dec. 1, 1927.

Commissioner Van Voorhis in his memorandum accompanying these and other representing all walks of life orders said that it appeared from the financial statement that there had been a falling off of the gross revenue of the company for the past three years of approximately $26,000.

Greetings from Grand Rapids

Favorable comment has reached L. J. DeLamarter, vice-president and general manager Grand Rapids Railway, Grand Rapids, Mich., on his novel New Year's card, "The Skipper of the Town Trolley Says," the idea behind which is shown in the illustration reproduced herewith. The letters of commendation received from the newspaper men, city officials and others representing all walks of life reflect a spirit of good will and cooperation toward the railway in its efforts to give Grand Rapids a modern transportation system. When Mr. DeLamarter sent out about 2,500 of these cards as a personal greeting it was his idea to get a "little kick" out of an old subject. The card is to be reproduced in "Trolley Topics."


MAY OUR CARS AND SERVICE MEASURE UP TO YOUR EXPECTATIONS IN 1927!
HEY! HEY!
LEAPIN' LENA
CLANK! CLANK!
NINETEEN PLENTY SEVEN

A Fantastic New Year's Card from an Imaginative Man

New Blanket Franchise in Danville

The City Council of Danville, Ill., has adopted an ordinance granting the Illinois Power & Light Corporation a franchise to operate street cars and buses over the streets of the city. This was done after the length of the franchise had been changed from 30 to 20 years and made to specify that the company may abandon railway service and substitute buses only on the consent of the Council. Under the new franchise the entire system is included in one ordinance. Heretofore there have been separate franchises and grants for the different lines.

Terms of General Franchise Draft for Kansas City Approved

The City Council of Kansas City, Mo., has approved the general plan proposed by the special franchise committee of the Council for a basis for drafting a new franchise for the Kansas City Public Service Company. The vote on the plan was unanimous.

Discussion has arisen as to the question of valuation of the properties of the company. The proposed grant does not mention a definite valuation figure, but infers a valuation of $25,000,000, by allowing a $2,000,000 yearly income. This is 8 per cent on $25,000,000. This difficulty will probably be settled when the franchise committee starts work on the new draft.

The question of depreciation was clarified by A. N. Gossett, chairman of the committee. He stated that it is the intention of the committee to provide that depreciation shall be taken out of the net income of $2,000,000. Under the old franchise depreciation is regarded as part of operating expenses.

Pacific Electric Seeks Higher Fares

The Pacific Electric Railway has applied to the California Railroad Commission for permission to increase its passenger rates and fares throughout its system in southern California, alleging that its present rates are inadequate to provide a fair return upon its investment in its property. The applicant alleges that the valuation of its interurban and local railway lines and coach and bus lines is in excess of $85,000,000 and that its operating income for the first nine months of 1926 was $495,318 less than that for the first nine months of 1925. The operating income of the applicant, after deducting operating expenses for the year 1921, 1922, 1923, 1924, 1925 and 1926, was as follows:

1921	$3,192,424
1922	3,542,207
1923	4,463,751
1924	3,714,350
1925	2,356,581
Jan. 1 to Sept. 30, 1925	1,906,170
Jan. 1 to Sept. 30, 1926	1,410,852

The petitioner requests the commission to increase its fares as follows:

INTERURBAN SCALE

Kind of Fare	Present Rate per Mile	Proposed Rate per Mile
One-way fares	$0.0275	$0.03
Round-trip fares	.0225	.025
Ten-ride commutation	.02	.0225
Thirty-ride family tickets	.0175	.0175

(It is proposed to change the form of this ticket from 30-ride with 90-day limit to 20-ride with 60-day limit.)

46-ride school tickets; week-day tickets, calendar month tickets and 60-ride tickets reduced 20 per cent.

LOCAL AND MISCELLANEOUS FARES

Kind of Fare	Present Rate	Proposed Rate
Local within cities	$0.06	$0.07
Minimum interurban	.06	.07
L. A. between zone	.10	.12
Minimum L. A. interurban O.W.	.10	.12
40-ride school	.03	.03⅓
Strip tickets—Glendale	.05	.06¼

Ten-Cent Rate in Rome

Under an order of the Public Service Commission, the New York State Railways, effective on one day's notice, will establish a ticket rate of three tickets for 25 cents in the city of Rome, N. Y. There will be a 10-cent rate for passengers who do not purchase the three tickets. The new rates are effective for six months and thereafter until the commission shall otherwise order.

Evidence submitted before Commissioner Lunn showed the New York State Railways was operating in Rome at a loss, the average deficiency each year from 1920 to 1925, inclusive, being $18,954. Commissioner Lunn in a memorandum with the order showed that since November, 1921, when the company was directed to make certain improvements to its track and system in Rome, it had expended $134,129 in improving the service.

The commissioner said that service in the new residential districts of Rome would not warrant extension of existing lines and the question of the present service was considered unfavorable in view of the fact that new equipment was necessary.

Under the new rate additional revenue of $19,000 is expected. This is based on 80 per cent of the Rome riders using the tickets and 20 per cent paying the cash fare.

Rochester Men Receive Insurance Policies for Safety Records

Insurance policies have been issued to 350 motormen and conductors of the Rochester lines of the New York State Railways as a result of an accident prevention contest conducted under the supervision of Leon R. Brown, safety director, during the year 1926. These men operated the whole year without an accident and received the policies as a reward.

The policy is in the form of group insurance issued by the Travelers' Insurance Company and pays $10 a week compensation in case of sickness. The same amount is paid for disability due to non-occupational accidents and $1,000 in case of accidental death occurring outside working hours.

The company is continuing this practice of rewarding careful employees this year and at the end of 1927 a larger crop of men with spotless accident records is looked for. In a safety contest conducted among the different divisions, which closes May 1, members of the winning team will receive new uniforms.

Fitkin Utility Managers Convene

More than 225 managers and department heads of the Fitkin Utilities convened in New York and Asbury Park for their sixth annual convention on Jan. 18. After a jollification and reunion party held on the evening of Jan. 18, the entire convention moved in a special train to Asbury Park, where they made headquarters at the Berkeley-Carteret Hotel. Here, separated from the turmoil of the big city, the utility managers were free to discuss in an intimate manner the problems of their properties and learn of the policies and plans of the Fitkin management.

The utilities in this large group are combined under the leadership of A. E. Fitkin and are managed by the General Engineering & Management Corporation of New York, of which T. R. Crumley is president. This organization has had a spectacular growth in the last few years, and controls properties that today serve a thousand communities in sixteen states. The combined valuation of all the properties in this group is approximately $205,000,000 which is in the service of 500,000 customers. It is estimated that 1,750,000 people are served by the eight electric railways in this group.

While the reunion meeting on Jan. 18 was entirely informal and consisted of a buffet supper and entertainment features, A. E. Fitkin spoke a word of welcome. During the Asbury Park sessions several prominent men spoke, among whom were Senator William A. Stevens of New Jersey; Harold G. Hoffman, Congressman-elect from South Amboy, N. J.; Thomas J. Walsh of E. H. Rollins & Son, New York; A. K. Baylor of the General Electric Company, New York City; Ralph J. Ritchie, operating manager of the General Engineering & Management Corporation; Gen. Guy E. Tripp, chairman of the board, Westinghouse Electric & Manufacturing Company; Francis H. Sisson, vice-president of the Guaranty Trust Company, and R. F. Pack, president of the National Electric Light Association. The business sessions were divided into functional groups of accounting, engineering, customer ownership, and new business, and into the sectional groups of railways, gas, ice, electric and new properties.

Among the railway men present were J. J. Coleman, vice-president and general manager Scranton Railways; S. S. Crane, vice-president and general manager Altoona & Logan Valley Railway; V. A. Redfield, general manager Citizens Traction Company, Oil City; E. O. Shryock, general manager Youngstown & Suburban Railway, Youngstown, Ohio; B. E. Waltz and W. M. Willett, Aurora, Ill., and J. E. Wayne, vice-president and general manager York Railways, York, Pa.

News Notes

More Safety Cars Installed.—Safety cars have just been assigned to two more Atlanta, Ga., lines of the Georgia Railway & Power Company, the River and Soldiers' Home lines, bringing the total number of Atlanta lines using one-man safety cars up to eleven. With the placing of safety cars on these two lines, the number of such cars now in use in Atlanta has reached 100, and it is hoped that even more one-man cars can be added to the system later. The cars being installed are of the most modern type.

Outdoor Garage Plan Condemned.—The parking of automobiles at an angle from the curb on widened thoroughfares has been condemned by Director of Streets and Sewers Brooks of St. Louis, Mo., and he has urged the defeat of a proposed ordinance that would permit such practice on Delmar Boulevard and on De Baliviere Avenue. "Why widen our streets if we propose to make them public garages?" he has asked members of the Board of Aldermen. He has pointed out that it is folly for the city to compel taxpayers to pay for costly improvements designed to speed up traffic along the streets if such work is to be nullified through the passage of ordinances which will reduce the roadway capacity of such streets for moving vehicles at least 50 per cent.

Baltimore Has Thermostats.—The United Railways & Electric Company, Baltimore, Md., has completed the installation of thermostats in all the street cars. This action was taken under revised regulations adopted by the Maryland Public Service Commission and agreed to by the railway. A temperature of 45 deg. will be maintained automatically in all the cars at all times.

Gold Stars for No Accidents.—Gold stars were presented to 53 trainmen of the Jacksonville Traction Company, Jacksonville, Fla., on Jan. 7 for remarkable accident records. These trainmen included two who operated cars for twelve years without having an accident charged against them. Each of these men has covered 324,000 miles of the tracks in Jacksonville. Tribute was paid to the gold star men by Manager Ingle at a banquet held in their honor. Mr. Ingle presented the gold stars and acted as toastmaster. Mayor Alsop said that the record established by these men showed the careful manner in which street cars were operated and also the efficiency of the Jacksonville Traction Company. Trainmen of the company are now engaged in a three-months safety contest for prizes amounting to more than $1,000.

Employees to Write Plays.—Women employees of public utility companies are invited by Zilla R. McClure, Milwaukee, chairman of the women's committee of the Wisconsin Utilities Association, to participate in a playwriting contest. The sketch must deal with some human interest phase of the utility business and must not take more than twenty minutes for presentation. Copy must be submitted to Mrs. McClure before March 1. First prize will be an electrical appliance valued at $25 and second prize will be a $15 electrical appliance.

Wants Two-Cent Fare Increase.—The Citizens Railway, Clarksville, Tenn., has petitioned the Tennessee Railroad and Public Utilities Commission to increase its cash fare from 5 cents to 7 cents. The company operates 5 miles of line.

Fares Increased.—The Public Utilities Commission of Maine has granted the petition of the York Utilities Company to increase fares, effective at once. The changes affect the zone from Johnson's Crossing, Sanford, Me., to Springvale, Me., where the fare is increased from 5 cents to 10 cents, or ten tickets for 80 cents. Student rates remain the same.

Wages Reduced in St. Petersburg.—A reduction in wages of motormen and maintenance men of the Municipal Railway, St. Petersburg, Fla., amounting to approximately 5 cents an hour for a nine-hour day was announced recently by R. E. Ludwig, Director of Public Utilities. effective on Jan. 7. By this action the wage scale reverts to its status before July 1, 1926, when a 5-cent increase went into effect. The cut will affect about 70 men. Motormen formerly received 65 cents an hour.

Changes Advertising Tactics.—The Oklahoma Railway recently announced that instead of using company advertising on car cards and the white street cars it will utilize this space for advertising Oklahoma City, Okla., during the coming year. This, the company believes, will make a favorable impression upon thousands of visitors to the capital city.

Sues City in Damage Case.—The Eighth & Ninth Avenue Railway, New York, N. Y., recently consolidated, served Corporation Counsel Nicholson on Jan. 10 with a summons and complaint in a $2,700,000 damage suit against the city. The papers allege damages to the surface line on Eighth Avenue by construction of the Eighth Avenue-Washington Heights subway. It is alleged that subway construction caused injury to public tracks and to other property estimated at $2,500,000 and has caused delays in operations which have resulted in a $200,000 loss in revenue.

Recent Bus Developments

Injunction Sought in Louisville

Railway Proceeds Against Threatened Competitor — Bus Manufacturer Cancels Contracts for Vehicles

Suit to enjoin the People's Transit Company from operating passenger buses on the streets of Louisville, Ky., in competition with the Louisville Railway was filed in Chancery Court recently, but as the prayer of the petitioner does not seek a temporary restraining order the case will be assigned to one of the chancery divisions in the regular course of business and will then be set for a hearing at an agreed date.

It is alleged in the petition that the defendant company is threatening to exercise certain franchise rights to which it is not entitled, and that it should be enjoined from exercising this privilege until it has acquired such franchise in accordance with the provisions of the laws of the State of Kentucky and ordinances of the city of Louisville.

COMPANY NOT ENTITLED TO RIGHT

The petition further sets out that the acts threatened by the defendant company, which it will commit unless restrained and enjoined by the court, "will deprive the plaintiff of a great amount of revenue arising out of the transportation of passengers, and will thus impair the value of the plaintiff's property, its rights and franchises, and will necessitate the raising of the rate of fare to be charged by the plaintiff for the transportation of passengers on all the plaintiff's lines within the limits of the city of Louisville, in order that the plaintiff may receive a reasonable return, for adequate service to the public."

The petition further avers that the railway is required, under the terms and conditions of its franchise obligations, to continue to give service to the public in the transportation of passengers over all lines operated by it, whereas the defendant, if permitted to operate under a mere annual license, as it is threatening to do, will, unless enjoined by the court, pick out the most profitable routes in the city for its operation and be at liberty to discontinue any or all of its operations any time it sees fit.

COMPANY'S ATTITUDE STATED

The attitude of the company has been stated by James P. Barnes, president of the railway, as follows:

> The Louisville Railway has heretofore announced its policy to develop a homogeneous transportation system for the entire city of Louisville through the co-operation of street cars and buses. The co-ordinated operation has already been several months in force and the policy of its continuation and extension will be followed in line with the original announcement.
>
> It stands to reason that a general and comprehensive transportation system serving all parts of the city is better than congestion and over-service in some parts of the city and insufficient or entire lack of service in other parts.
>
> Therefore, it is our best judgment based on the whole history of transportation, that the best possible service, at the lowest possible cost, can be rendered only by a complete co-ordinated system under proper governmental regulation.

The plan of the People's company was to operate on Broadway, Market Street and other main thoroughfares in competition with the Louisville Railway, and in furtherance of its plan the bus company ordered seven buses from the Mack company through B. J. Brumleve, Louisville manager of the Mack-International Truck Company. This order, however, was rejected because of the unfair competitive condition involved.

COMPETITION STARTED ON BROADWAY

The People's Transit Company finally got its line started on Broadway on Jan. 17, or a month and two days later than it had expected to start service. After the Mack truck interests canceled the contract the People's Transit Company announced that it would secure other buses and go ahead. It arranged to install Reos. Tickets are sold at four for 25 cents, or sixteen for $1. The cash fare is 7 cents, the same as that of the railway. The line runs from Shawnee to Cherokee Park, a distance of close to 10 miles. Service is from 5:30 a.m. to 12:30 midnight. The company plans other lines on leading streets of the city.

The railway's suit was to have come up last week, but the hearing was delayed by the illness of a judge. Licenses for operation of the buses were issued just as any other auto license is issued.

Ottawa Joins Gray Line Owners

The Ottawa Electric Railway, Ottawa, Ont., has accepted an invitation to become a member of the Association of Gray Line Owners, an organization limited to companies operating the finest type of sightseeing motor coaches in the large cities of Canada and the United States.

In accordance with the terms of membership the motor coaches of the Ottawa Electric Railway will be painted one of the various shades of gray and will carry the association's diamond-shaped insignia bearing the words "The Gray Line."

The enrollment of the Ottawa Electric Railway in the Gray Line Association places Ottawa on the de luxe tourist map. The city will be advertised in all Gray Line literature throughout the United States and Canada as one of the cities worth visiting. Several pages in the association's sightseeing booklet, hundreds of thousands of which are distributed each year, will be devoted to the capital of Canada.

Montreal and Toronto are also members of the Gray Line Association and tourists when visiting these other cities will be routed by way of Ottawa.

Bus Does Well in Davenport

Three Months Operation by Tri-City Railway Proves Worth as Ally to Railway

The operation of motor coaches in Davenport, Iowa, for the last three months has brought out the fact that these vehicles were not only popular at their inception, but that their popularity has remained after the period of curiosity was past. Under the management of employees, who have been commended for the way they have taken hold of this new type of transportation, the motor coaches have proved safe and dependable in all sorts of weather.

Motor coach operation was started by the Tri-City Railway of Iowa in Davenport, on Oct. 3, 1926, over a route 4.76 miles long. This service replaced street car service on West Seventh Street, Le Claire Street and East Locust Street. In addition it provided a route extension into the residential district along Belle Avenue, which was the first extension of transportation service in the city of Davenport in ten years. Through the introduction of this motor coach line the company was also enabled to reroute the Oakdale service over a more direct and satisfactory line to the business district along Fifteenth Street and Brady Street, combining it with the Vander Veer Park line and making one of the best patronized rail routes in the city.

Upon the introduction of service on the motor coach line the company offered to furnish a fifteen-minute service throughout the day with four vehicles. In order to guarantee sufficient vehicles for regular service and provide for some additional tripper service, the company bought eight vehicles or twice the number used for regular service. Soon after the service was started two additional coaches were introduced to give a 7½-minute interval on the route from the business district to the east end from 4 to 6 o'clock in the afternoon. It was then found advisable, as the holiday trading season approached, to put on a ten-minute service throughout the route in the afternoon between 4 and 6 o'clock and in addition run enough extra units to make a five-minute interval to the east end. This required eight coaches in all, or the entire number available. Later a ten-minute service throughout the route in the morning hours from 6 to 8:30 was put in effect and on Dec. 18, which was the last Saturday before Christmas, a special 7½-minute service was given throughout the entire route from noon until 10 o'clock at night. Fourteen and one-half more vehicle-hours or 125 additional coach-miles a day are being provided than were contemplated at first.

The company's equipment consists of six 21-passenger coaches made by the Yellow Truck & Coach Manufacturing Company and two Mack 25-passenger, gas-electric motor coaches. The last two units named are of a special design, just recently brought out. All of the above units are provided with special genuine leather seats of the most comfortable design. In addition to the above equipment one more Mack 29-passenger, straight gas-motor coach was purchased recently. A feature which shows the company's earnest desire to serve was the fact that this motor coach was unloaded at 2 p.m. Friday afternoon, Dec. 17, taken to the shops of the company, thoroughly inspected by the manufacturer's agents, cleaned, a register installed, the destination sign painted, dried and installed and the coach placed in operation during the evening rush in just two hours and 45 minutes.

The operation of the motor coach has been especially satisfactory from the standpoint of freedom from accidents and dependability in service. Injuries, of course, have been practically nil. In regard to dependability of service, coaches have completed their schedules at least 99 per cent of the time.

Even in so short a time the company has developed considerable revenue from chartering the coaches for special service. Trips have been made to Rockford, Peoria, Burlington, Peru and other cities, to say nothing of numerous charter trips around the Tri-Cities. The company is interested in securing this type of business, as a large amount will justify keeping a greater number of units on hand for use in the peak hours of city service.

Wants Rochester Buses Under Service at Cost Contract

The New York State Railways, Rochester Lines, has filed a petition with the Public Service Commission asking that all bus lines in the city of Rochester be placed under the provisions of the service-at-cost contract by which the electric railway system is operated.

The railways petitioned for transfer of the franchises of the Ridge Road and Dewey Avenue feeder bus lines from the Rochester Interurban Bus Company to the Rochester Railways Co-ordinated Bus Lines, Inc. Both are subsidiaries of the railway. The latter is to operate in the city only, under the terms of the service-at-cost contract between the railways and the municipality.

Railways Commissioner Charles R. Barnes said that the approval of the commission was sought in this step in order to segregate the city bus lines from the company's interurban routes operated by the Rochester Interurban Bus Company.

Public Service Commissioner Charles Van Voorhis, to whom the railway's petition was submitted, reserved decision.

Bus Development Noted in Oklahoma.—Co-ordination of railway and bus service under the management of electric railways progressed rapidly in Oklahoma during the past year, according to the Oklahoma Public Utility Information Bureau. This development included installation of many new bus routes in Oklahoma City serving as feeders to lines of the Oklahoma Railway, purchase of several bus lines in Tulsa by the Oklahoma Union Railway and conversion of the electric railway urban and interurban system at Shawnee into bus service lines.

Miami Commission Passes Jitney Ordinance

The ordinance which eliminates jitneys from the close-in business section of Miami, Fla., was passed by the City Commission on Jan. 3. It will become effective within a month. Recently representatives of the jitney lines protested passage of the ordinance and they were told to submit a plan which might permit them to retire from the field on an adjusted compensation basis. However, they informed the commission that it was the desire of most of them to continue. This will be possible only through legal defeat of the ordinance. Routes now being served by jitneys will not be deprived of transportation, as the commission demanded a guarantee from bus lines that wherever a jitney was removed it would be supplanted by one of the larger vehicles. The officials claim the new ordinance will relieve traffic congestion and represent a large saving annually to the taxpayers. The jitney ordinance was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Jan. 15, page 143.

Engineers Against Buses on Park Avenue, New York

Eighteen reasons why the city of New York should abandon its intention of establishing a bus route in Park Avenue are set forth in a report sent by Fisk & Roberts, consulting engineers, New York, to H. Gordon Duval, president of the Park Avenue Association, and made public recently.

The Board of Transportation has included a "Lafayette Street, Madison Avenue and Park Avenue" route in the proposed bus system for Manhattan, applications for a franchise for which are before the Board of Estimate. The report says that use of Park Avenue for a bus route is opposed by more than 99 per cent of 5,000 persons in the section canvassed. The engineers say:

> There is also a definite feeling on the part of residents that Park Avenue is already doing its share as a traffic artery. In addition to carrying a tremendous volume of vehicular traffic, it is also carrying under its surface the enormous passenger traffic of the New York Central and the New York, New Haven & Hartford Railroads.
>
> It must be admitted that in providing public transportation on any highway which previously has been without it, there will be resultant disadvantages, as well as the very evident advantages. It is a common occurrence for persons living directly on streets devoted primarily to residential purposes to object to bus operation. Such objectors cite as reasons for their opposition the noise of engine exhausts, particularly during sleeping hours; the poisonous and unpleasant fumes from these exhausts, and the accident hazard created by the operation of public vehicles on a fixed schedule which drivers are expected by their employers to adhere to.
>
> However, Park Avenue is not an ordinary residential street. Most Americans will call it the finest residential street in New York City. Most New Yorkers will argue that it is the finest residential street in America. It is unnecessary here to describe its character in any detail.

Other disadvantages that would result to residents of Park Avenue, summarized by the report, are additional vibration from heavy buses because of the railroad tunnel underneath, a great increase in traffic congestion, reduction of speed of all vehicular traffic, decreasing use of Park Avenue by private automobiles, the mixing of high speed automobile traffic with low speed omnibus traffic, and probable injury to near-by surface lines on Madison and Lexington Avenues, which might prevent their rehabilitation. The report adds:

> A large part of the present bus traffic on Fifth Avenue will be diverted to the proposed Park Avenue route. This will be especially true if the fare on the Park Avenue route is 5 cents, as proposed by some of the franchise applicants. The diversion of this traffic from Fifth Avenue to Park Avenue will be of little or no assistance in solving the city's transportation problem and might be detrimental to business interests on Fifth Avenue.

Another Buffalo Grant to E. M. Howe

The City Council of Buffalo, N. Y., has approved the application of Ernest M. Howe, Detroit, representing the Buffalo Motor Coach Corporation, for a franchise to operate buses on three local lines in the city of Buffalo at an 8-cent fare with free transfers to connecting bus lines. Following the approval of the plan by the City Council and the granting of a five-year franchise Mr. Howe informed Mayor Frank X. Schwab that immediately he would petition the New York State Public Service Commission for a certificate of convenience and necessity. He promised 25 buses would be in operation on the three routes within 60 days after the consent of the state utilities board has been obtained.

Mr. Howe's franchise runs for a period of five years and provides that if the city becomes empowered to operate municipal buses the three lines of the Buffalo Motor Coach Corporation can be taken over by the city on six months notice.

Opposition to the franchise was voiced by counsel for the International Railway and its subsidiary, the International Bus Corporation. The International Bus Corporation told the City Council it stood ready to give additional service over new routes under applications tabled since last spring.

Mr. Howe obtained a franchise from the Buffalo City Council a year ago to operate 5-cent buses over thirteen routes in the city, but approval never was obtained from the Public Service Commission as Mr. Howe and the American National Omnibus Corporation, New York, lacked $300,000 of the necessary $1,500,000 paid in capital on the last day allowed by the state utilities board to complete its financing and appear before the commission for a hearing on its application for a permit.

New Route Opened.—The Boston Elevated Railway, Boston, Mass., recently put in operation three new bus routes. These serve territory not previously reached by railway service.

Buses Between Aurora and Elgin.—The Aurora, Elgin & Fox River Electric Company, operating an interurban service from Aurora to Elgin, Ill., has been granted a permit to install buses between those two cities, on routes on both the east and west Fox River roads. The new system, it is said, will not interfere with the present interurban service, but will act as feeder to the interurban line and reach a territory not in the interurban field.

Financial and Corporate

St. Paul Seeks Suggestions

Earnings of Lines There Fall $485,000 Below Amount to Which Company Is Entitled

The St. Paul City Railway, St. Paul, Minn., has asked the St. Paul City Council for advice. Under a ruling of the Minnesota Railroad and Warehouse Commission the railway is allowed to make 7½ per cent upon its investment. An agreement is on file that earnings of the Twin City Motor Bus Company, a subsidiary of the Twin City Rapid Transit Company, the parent organization for both companies, above 7 per cent will be turned over to the railway. The earnings of the bus company upon preliminary report seem to fall below this figure. These are to be filed in detail soon. At any rate the earnings of the St. Paul City Railway are about $485,000 in 1926 below the earnings to which the company is entitled, or $715,000 instead of $1,200,000.

Two alternatives present themselves. One is an advance in the rate of fare from 8 cents cash or six tokens for 40 cents. The other is an amendment to the city charter which will relieve the company of certain charges, such as paving between the tracks, as suggested by the state commission, when the fare rate was announced. Such an amendment failed to pass at the November election.

A letter from Horace Lowry, president of the Twin City Rapid Transit Company, reads:

> On Jan. 1, 1926, under authority of the Minnesota Railroad and Warehouse Commission, there was put into effect in the city of St. Paul a railway rate of 8 cents cash with a token rate of six for 40 cents.
>
> During the year 1926 both Minneapolis and St. Paul agreed with the commission and the railways on the property values and the rate of return, and entered into stipulations to the commission and the courts, so this problem no longer confronts us.
>
> In its order the commission clearly states that unless St. Paul relieves the St. Paul City Railway of certain burdens of taxes, paving and special assessments it would be impossible for the property to earn a fair return on the established fair value of its property.
>
> The St. Paul City Council and taxing authorities have already relieved the company of overtaxation as suggested by the commission, but nothing else has been accomplished.
>
> At the November election there was submitted to the voters a charter amendment the purpose of which was to authorize the City Council to relieve the company of paving and certain other burdens, but this amendment was defeated because it was submitted at a general election instead of being made the subject of a special election at the general election, as we urged.
>
> This is proved by the fact that a substantial majority of those voting on the question voted in favor of adopting the amendment.
>
> There are other operating economies, some of which we have already suggested, which could be brought about by close co-operation between the company and the city.
>
> In its order the commission stated that it had reason to believe that the city of St. Paul would give serious consideration to the situation within a reasonable time, but a year has now elapsed.
>
> For your information, the 1926 operation of the St. Paul City Railway will be about as follows, although there may be some slight variation on account of the last part of the year being estimated (very closely, we believe):
>
> | | |
> |---|---|
> | Gross revenue | $4,592,000 |
> | Operating expenses, rentals, taxes, etc. | 3,877,000 |
> | Available for return on the investment | $715,000 |
>
> The commission, the city and court agreed that the company was entitled to earn more than $1,200,000 in order to give the company a fair return on the value of its property. It is therefore obvious that the company will be short about $485,000 during 1926 from what it is entitled to earn.
>
> We wish to assure your honorable body that we want to do all in our power to avoid a higher rate of fare in St. Paul, but without your help and co-operation we cannot avoid it.
>
> We sincerely hope you will give this your early consideration, and advise us of your suggestions as to how the necessary reduction in expenses can be accomplished.

Deficit in Cincinnati Due to Buses

Operation of buses by the Cincinnati Street Railway, Cincinnati, Ohio, has resulted in a loss in the earnings of the company, according to a report embodying the December figures of the company, which Walter A. Draper, president, recently submitted to Edgar Dow Gilman, Public Utilities Director. During December the report shows that the total of revenue passengers reached its peak on electric cars for the year, but there was a loss of $15,754 in operation of buses. In view of the fact that there is only $420,837 in the fare control fund, and judging from the earnings of the company during the past year, car riders, according to Mr. Draper, cannot expect a reduction in the rate of fare for at least the next two or three years. The present cash fare is 10 cents, with tickets sold in strips of three for a quarter. Mr. Draper explained that operating expenses also reflected the large amount that is being expended by the company in connection with track reconstruction.

Detroit Wants to Know

Councilman Propounds Questions Calculated to Fix Relative Earning Power of Railway and Bus Lines—Mayor Comments on Terms of Contract Under Which City Purchased System

A REAUDIT of the books of the Department of Street Railways at Detroit, Mich., for the year ended June 30, 1926, was asked in a resolution introduced in the City Council on Jan. 11. Two audits have already been made, one by William M. Hauser, D.S.R. auditor, and one by Price, Waterhouse & Company, and the resolution providing for a reaudit is the result of the fact that the audits were about $1,000,000 apart. The D.S.R. auditor's report showed net earnings of about $500,000 for the system, while the other audit showed a deficit of several hundred thousand dollars.

The third audit, requested by a unanimous resolution of the Council, was opposed by Mayor Smith. He stated that it will do no good, because where the last audits differ is in depreciation charges. The Mayor further cited that the D.S.R., in assuming such a heavy interest and debt charge at the time of its purchase, did something that no private company has ever done.

Councilman Sastator, who introduced the resolution, cited that the City Charter provides that an unprejudiced audit of the books be made every year. He also prepared and submitted a list of nineteen questions relative to the municipal railway accounting methods, stating his belief that the railway lines are subsidizing the bus lines and that the cars, which carry the bulk of the passengers, are handicapped by the buses.

Among the questions propounded by Councilman Sastator and the data sought were the following:

> Is bus operation such that the lines meet the costs, or are they actually being subsidized by the trolley division?
>
> In bus data shown in monthly statements, are any costs included other than strictly maintenance and operating costs?
>
> Is there any distribution of charges to bus operation for erection of new garages, alteration of carhouse, rental of space and equipment at carhouses or the pro rata cost of time of D.S.R. executives, claims, equipment, auditing, fare inspection, etc.
>
> In what account is depreciation of bus equipment shown, and what is the rate on single-deck buses?
>
> Is it the opinion that the single-decker will be fit for operation beyond 75,000 miles, except at prohibitive costs?
>
> If not, what funds are available to replace the equipment?
>
> How much paving tax has been paid to the city by the bus division and how many miles has division operated to date?
>
> List number of buses, date placed in operation, total mileage to date and average miles a month for each vehicle, for last twelve months, or since going into service.
>
> List the individual bus routes, date installed, length of route, number of buses at peak, revenue, revenue per mile first three months of operation and same figure for three months ended October, 1926, total miles operated for first three months, and for three months ended October, 1926.
>
> Give the total number of bus claims filed against the department in the same period and claims allowed or litigation with amounts and names of plaintiffs. Show where this expense is represented in bus costs as printed in monthly statement, and where bus division is charged to build up its share of injuries and damage reserve.
>
> Give number of "dead" miles operated monthly on each bus route, and percentage this represents of total route operation.
>
> When were 50 double-deck Fageol coaches ordered?
>
> What was delivery date, and how many have been delivered?
>
> What funds are available to pay for these 50 coaches, other than money now in regular funded reserves of the trolley division, such as for injuries and damages reserve?
>
> Give the trolley car revenue for each month, on Woodward Avenue and Jefferson Avenue, before installation of single-deck buses on these lines, and trolley revenue for 30 days after, installation of single buses.
>
> Why is it not advantageous to keep bus costs entirely separate from trolley costs?
>
> Why have figures from each division merged in your general accounts?

The questions were asked by Mr. Sastator as a member of the body which approves or disapproves contracts for the purchase of buses and street cars, so he could vote in the future with the facts before him, he stated.

Mr. Hauser's report in reply to the questions shows a falling off in the earnings of the street cars on Woodward, Jefferson and Grand River lines from $401,443 in June, before bus lines were established on these streets, to $357,094 in August after they were established. The average daily income fell from $13,381 in June to $11,519 in August. He stated that coach operation is such that the lines as a whole meet the costs and they are not being subsidized by the street car rider.

The decrease in the average revenue per day on the three lines just mentioned, according to Mr. Hauser, cannot be attributed wholly to the installation of coach service on Jefferson, Grand River and Woodward Avenues. The general traffic was subject to a slump in August, 1926, compared with June, 1926. It is further cited that the competition between the D.S.R. facilities and those of the jitneys and the Detroit Motorbus Company was at its height. Arguments are presented in support of the view that none of such items as erection of garages, alterations to carhouses. and salaries of D.S.R. officials should be considered, and that none of the items should have been reflected in the bus operation cost figure.

Colorado Property to Be Sold

The Denver & Interurban Railroad, which for nineteen years operated between Denver and Boulder, Col., has been advertised for sale at auction. The auction is to be held at an old Interurban carhouse in Denver on Feb. 16 with John J. Morrisey, local attorney, special master in chancery. No upset price has been named for the property. The road is to be sold to satisfy a $1,250,000 claim covered by a mortgage in favor of the Guaranty Trust Company, New York, as trustee.

Readjustment Talk at Boston

Metropolitan Transit System Suggested as New Company to Succeed Boston Elevated

Many new plans and propositions are being developed for the future of the Boston Elevated Railway and are finding their way to the Massachusetts Legislature. The latest is a bill offered by Henry I. Harriman, chairman of the Metropolitan Planning Division, providing for the abolition of the Boston Elevated, the wiping out of its board of public trustees and the creation in its place of a new corporation to be known as the Metropolitan Transit System. This is the plan to which brief reference was made in ELECTRIC RAILWAY JOURNAL, Jan. 15, page 144.

Three public incorporators are to be appointed by the Governor, under the provisions of this bill, and they are to form the new company. The present Elevated Company is to sell its property to the new company and the new securities are to be 4½ per cent preferred stock and 5 per cent common stock. There is to be no money exchange in the transaction, for the road is to take one share of common stock at 5 per cent for one share of present common stock, which pays 6 per cent.

For the present first preferred stock, which pays 8 per cent, the new company would give new 4½ per cent preferred stock at $125; second preferred stock of the present company, paying 7 per cent, would be exchanged for the new 4½ per cent preferred at $110. The present special preferred stock would be converted into the new preferred at $105.

There is ample provision in the bill for non-assenting stockholders. The new arrangement would save $800,000 yearly in interest charges; of this sum the first $200,000 would be applied to a sinking fund for the purchase of preferred stock at par by the Commonwealth. The next $400,000 would be used to pay the present deficit to cities and towns which advanced money to the Elevated years ago, and the balance of $200,000 would be used to pay rental charges on new transit extensions.

Further, the bill provides for a 50-year extension of the public control, and during that period the state would acquire complete ownership of the corporation. The Supreme Judicial Court would be called upon to liquidate the present Boston Elevated Railway, winding up its affairs, and a board of trustees would be appointed by the Governor to operate the road, its chairman to receive $15,000 a year.

Foreclosure Sale Postponed.—Sale of the Second Avenue Railroad, New York, under foreclosure has been postponed to June 23, according to Charles E. Chalmers, receiver for the company. The sale was set originally for Jan. 13. The terms of the reorganization were reviewed in the ELECTRIC RAILWAY JOURNAL for Dec. 18, page 1115.

New Director Elected.—H. Fairfield was elected a director of the Homestead & Mifflin Street Railway, Homestead, Pa., on Jan. 11.

Bonds Being Paid Off.—The $330,000 of 7 per cent bonds of the Springfield & Eastern Street Railway, Springfield, Mass., due Jan. 1, 1927, are being paid off at the office of the Springfield Safe Deposit & Trust Company. The Springfield & Eastern Street Railway is a subsidiary of the Springfield Railway.

Cash Fares Lower.—The Binghamton Railway, Binghamton, N. Y., carried a total of 13,369,577 revenue passengers in 1926. This shows a decrease of 1,001,582 cash fares since the close of 1925, when 14,371,159 passengers paid to ride on the cars. In spite of these figures the car-miles for 1926 were 2,214,850, compared with 2,216,881 for 1925, over a track mileage of approximately 50 for both years.

Traffic Increases.—A slight increase in the number of passengers carried by the United Railways & Electric Company, Baltimore, Md., for the first eleven months of 1926 is noted in comparison with similar period a year before. For the eleven months of the year just ended 205,273,813 passengers were carried, against 204,341,300 for the eleven months period ended November, 1925.

Net Income Increases.—For the six months period ended Dec. 31, 1926, the total operating revenues of the Brooklyn-Manhattan Transit Corporation and affiliated companies, Brooklyn, N. Y., was $23,329,938, against $22,463,954 in 1925. Total operating expenses increased from $14,546,414 for the six months period of 1925 to $14,967,150 in 1926. After the consideration of income deductions a net income of $3,310,883, remained for the six months period ended Dec. 31, 1926, against $2,994,524 for a similar period in 1925.

Conspectus of Indexes for January, 1927

Compiled for Publication in This Paper by
ALBERT S. RICHEY
Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	Jan. 1927 **7.42**	Dec. 1926 **7.42**	Jan. 1926 **7.32**	Nov. 1926 **7.42**	May 1923 **6.88**
Electric Railway Materials* 1913 = 100	Jan. 1927 **156.0**	Dec. 1926 **159.2**	Jan. 1926 **154.3**	Sept. 1920 **247.5**	Oct. 1924 **148.5**
Electric Railway Wages* 1913 = 100	Jan 1927 **226.6**	Dec. 1926 **226.3**	Jan. 1926 **223.8**	Sept. 1920 **232**	Mar. 1923 **208.1**
Am. Elec. Ry. Assn. Construction Cost (Elec. Ry.) 1913 = 100	Jan. 1927 **203.5**	Dec. 1926 **203.2**	Jan. 1926 **202.2**	July 1920 **256.4**	May 1922 **167.4**
Eng. News-Record Construction Cost (General) 1913 = 100	Jan. 1927 **211.5**	Dec. 1926 **210.8**	Jan. 1926 **207.2**	June 1920 **273.8**	Mar. 1922 **162.0**
U. S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Dec. 1926 **147.2**	Nov. 1926 **148.1**	Dec. 1925 **156.2**	May 1920 **246.7**	Jan. 1922 **138.3**
Bradstreet Wholesale Commodities 1913 = 9.21	Jan. 1 1927 **12.82**	Dec. 1 1926 **12.78**	Dec. 1 1926 **14.01**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
U. S. Bur. Lab. Stat. Retail Food 1913 = 100	Dec. 1926 **161.8**	Nov. 1926 **161.6**	Dec. 1925 **165.5**	July 1920 **219.2**	Mar. 1922 **138.7**
Nat. Ind. Conf. Bd. Cost of Living 1914 = 100	Dec. 1926 **168.4**	Nov. 1926 **168.2**	Dec. 1925 **171.4**	July 1920 **204.5**	Aug. 1922 **154.5**
Steel Unfilled Orders (Million Tons) 1913 = 5.91	Dec 31 1926 **3.961**	Nov. 30 1926 **3.807**	Dec. 31 1925 **5.033**	July 31 1920 **11.118**	July 31 1924 **3.187**
Bank Clearings Outside N. Y. City (Billions)	Dec. 1926 **19.76**	Nov. 1926 **18.24**	Dec 1925 **29.38**	Oct. 1925 **29.47**	Feb. 1922 **10.65**
Business Failures Number Liabilities (Millions)	Dec. 1926 **1987** **51.70**	Nov. 1926 **1614** **60.31**	Dec. 1925 **1628** **43.11**	Jan. 1924 **2231** **122.95**	Aug. 1925 **1353** **27.22**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 137 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

Personal Items

Schenectady Railway's New Head

Steam Railroad Official Who Started His Career in 1878 Succeeds the Late E. M. Walker

James H. Hustis, former president of the Boston & Maine Railroad and for a lifetime connected with railroads and electric railways in various capacities, has been called from a year's retirement to succeed the late Edwin M. Walker as president of the Schenectady Railway, Schenectady, N. Y. Mr. Hustis took office on Jan. 8. He brings with him a wealth of experience in railroading, and it is believed by the officials of the New York Central Railroad and the Delaware & Hudson Company, joint owners of the electric railway, that this background fits him excellently for the post at Schenectady.

The shocking suddenness of Mr. Walker's death on Dec. 30, caused by carbon monoxide poisoning in a closed garage, and the necessity of finding a successor in a short time, gave Mr. Hustis little opportunity to formulate plans or policies for his administration. At present he is making an intensive study of the situation. Aside from a few generalities in regard to electric railway conditions in the city of Schenectady he was unwilling to discuss his future work.

He said quite frankly that he had no knowledge of the physical make-up of the Schenectady property or of its particular problems or needs. On that account he was unable to discuss the subject of the Schenectady lines in any detail. He did say, however, that on the way to Schenectady he had an opportunity to look over the balance sheet of the property and to study some of the figures covering the results of operation.

"My entire life," said Mr. Hustis, "had been spent in the transportation business until last spring, when I retired from the presidency of the Boston & Maine Railroad. Transportation, whether steam or electric, is, and, for that matter, has been, an essential public service. This country is what it is because of its unequaled transportation facilities. For some years, due to causes that do not now need to be discussed, a feeling of antipathy existed between owners and users. This feeling was not confined to any locality or section, but was quite general. Fortunately, that feeling is gradually disappearing, at least so far as steam railroads are concerned, with the result that 1926 was, generally speaking, a prosperous year for railroads and a prosperous year for the users of the roads.

"The stocks of merchants and manufacturers, which represent a vast sum running into billions, was never so low as last year, due to the ability of railroads to make prompt deliveries. Similarly in the electric railway field the public is recognizing that the electric railways are rendering an essential public service and that good service is essential to any important community, regardless of the great increase in the use of motor cars."

On his retirement from the Boston & Maine Railroad a year ago Mr. Hustis decided that he needed a rest and made a tour of Europe. After his return he traveled extensively in the United States, and at the time of his appointment to the presidency of the Schenectady Railway he was considering a pleasure trip to California or Florida.

J. H. Hustis

Mr. Hustis entered railroading in the office of the general superintendent of the New York Central Railroad in 1878. His first executive appointment came in 1891, when he was made trainmaster of the Harlem division. By 1900 he had worked up to the superintendentship. For the next two years he was superintendent of the River division, but in 1903 went to the Rome, Watertown and Ogdensburg division. In 1907 he was appointed general superintendent of the Western division.

During the year 1907-1911 he held the position of assistant general manager of the New York Central in charge of the Boston & Albany, and in 1911 he was promoted to vice-president with the same charge. During the year 1913-1914 he was made president of the New York, New Haven & Hartford and on Aug. 15, 1914, was elected president of the Boston & Maine Railroad.

Mr. Hustis was born in New York City on Jan. 11, 1864.

California Commission Reorganizes—Personnel Changes

Upon its recent reorganization the California Railroad Commission, at the suggestion of Commissioner Harley W. Brundige, who has served as president of the commission during the last two years, started a new policy of rotating the presidency of the commission among the commissioners in the order of their seniority. It elected Commissioner Ezra W. Decoto as president for the year 1927. President Decoto was appointed to the commission in January, 1925, previous to which he served as District Attorney of Alameda County for six years. He has been active in civic affairs in the state and in Alameda County for many years, and has had a thorough training in public utility matters.

President Brundige, the retiring president, has served the commission in that capacity four years, having been president during 1921-22, and also during 1925-26. The commission reorganized, following the reappointment to office of Commissioners Brundige and Whitsell, whose terms expired Dec. 31, 1926. Both were reappointed by Governor Richardson for the full term.

In carrying out the new plan of rotating the presidency, Commissioner Leon O. Whitsell, who is next to President Decoto in seniority, will be elected as president during 1928, and Commissioner S. Louttit will serve as president during 1929.

In adopting this policy the commission follows the plan of the Interstate Commerce Commission under which every commissioner who serves a term will have acted as chairman of the commission for one year. The duties and responsibilities of the Railroad Commission have increased so rapidly in recent years and the volume of the work handled by the commission has grown so large that the office of president throws upon the incumbent a tremendous amount of added work and responsibility. It is the unanimous opinion of the commission that this work and responsibility should be shared by every member of the commission.

D. L. Fennell Elected to Highway Safety Association

D. L. Fennell, general superintendent of transportation of the Kansas City Public Service Company, Kansas City, Mo., has been elected a member of the board of governors of the Missouri Street and Highway Safety Association. Mr. Fennell's appointment to the directing group of this state body constitutes fitting recognition of his activity and interest in promoting street and highway safety. It marks another step in the country-wide movement by transportation officials to co-operate in and identify themselves with the activities of public bodies working to better traffic regulation and promote public safety.

Changes on North Shore Line

C. Edward Thorney, former general passenger agent of the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., has assumed his duties as assistant to Hal M. Lytle, vice-president in charge of public relations, to which position he was recently appointed. R. S. Ames, formerly assistant general passenger agent at Milwaukee, succeeds Mr. Thorney in the traffic department. Both Mr. Thorney and Mr. Ames are experienced railroad men, having served in various capacities with other railroad companies before joining the North Shore Line.

Mr. Thorney was made general agent of the railroad at Milwaukee in November, 1925. Shortly after this he was appointed secretary of the company's Better Business Campaign, in which capacity he served until several months ago, when he was appointed to the position he held at the time of his most recent promotion.

Mr. Ames entered the service of the North Shore Line as general agent, passenger department, in Chicago in January, 1926. He was appointed to succeed Mr. Thorney as assistant general passenger agent at Milwaukee upon the latter's appointment to the Chicago office.

Indiana Commission Changes Announced

Formal appointment of Reid McCain of Delphi, Ind., as secretary of the Indiana Public Service Commission was announced on Jan. 1. Mr. McCain notified the commission of his acceptance and will take over his new duties immediately. He is a graduate of Franklin College and served two years as surveyor of Carroll County.

Appointment of Webb Gilbert as acting chief accountant to succeed John S. Powell, who resigned, also was announced by the commission.

A. P. Lewis, formerly connected with the Wichita Railway & Light Company, Wichita, Kan., has been named general superintendent of the Rockford, Beloit & Janesville Railway, Rockford, Ill., recently purchased by Milton Ellis, president of the Beloit Traction Company.

Judge L. D. Hill of Sparta, White County, Tenn., is now a member of the Tennessee Railroad and Public Utilities Commission. He was named in the November election as a Democrat and succeeded Julian H. Campbell, Republican, who received an appointment as United States Commissioner at Nashville.

A. F. Davey, manager of the Wisconsin Public Service Corporation's properties at Sheboygan, Wis., has been named manager of the Sheboygan-Manitowoc division of the company, under the recent plan placed into effect in a redistricting of the operating divisions. Mr. Davey will have jurisdiction over the operation of the electric railway and bus operations at Manitowoc and Two Rivers.

A. L. Fischer Made Purchasing Agent at Cincinnati

A. L. Fischer, assistant purchasing agent of the Cincinnati Street Railway, Cincinnati, Ohio, since its reorganization in November, 1925, has been appointed purchasing agent for the company. He had served the Cincinnati Traction Company as assistant purchasing agent since 1917, and when the Cincinnati Street Railway took over the operation of the street railway system last year he was retained in the same capacity.

Mr. Fischer, a native of Cincinnati, received the degree of bachelor of arts in 1896 at St. Xavier College at Cincinnati, and the degree of master of arts the following year from the same institution. He entered electric railway work in 1903 in the transportation department of the Cincinnati Traction Company. Mr. Fischer is a member of the committee of purchases and stores of the American Electric Railway Association.

© Bachrach

A. L. Fischer

The Glasgow Manager's Retirement

In accordance with the arrangement already reported, James Dalrymple retired from the post of general manager of the Glasgow Corporation Tramways on Dec. 31. He received various gifts from colleagues. Before he left he made an address to the staff of the department, in the course of which he said:

> It is now 22 years since I was appointed general manager. These years have been very strenuous, but the work has been extremely interesting. I have been looking into our records and I find that there are 66 still on the staff who joined the department with me in 1894, and there are 1,014 still in the service who were here when I became general manager in 1904.
>
> I leave the service with very great regret, as I have always been proud of being a member of the Glasgow tramways staff. You have made the Glasgow tramway system the envy of the whole tramway world. I thank you very sincerely for the loyal support you have given me during all these years, and I trust that, notwithstanding many difficulties, the Glasgow tramways will continue to flourish.

Mr. Dalrymple has received an offer by cable of the post of tramway adviser to the Johannesburg Corporation, South Africa. He has replied stating that he is willing to accept after the completion of his São Paulo engagement. The latter, it may be recalled, is for three months and is also an engagement in an advisory capacity.

On Dec. 22 the Glasgow Town Council accepted Mr. Dalrymple's resignation of the post of general manager of the tramways under circumstances which have already been outlined in these pages. The Council also adopted a recommendation by a committee that Mr. Dalrymple should be granted a retiring allowance of £832 11s. 2d. a year, being one-half of his average salary for the last seven years. This is the usual superannuation arrangement.

Obituary

M. H. Bronsdon

M. H. Bronsdon, Commissioner of Public Works in Providence, R. I., since 1924 and nationally known as an electric railway engineer, died on Jan. 15 in San Diego, Cal. Although already well known as a builder and operating engineer of electric railway lines, Mr. Bronsdon achieved his greatest prominence through his participation in the speedy rebuilding of the local railway lines in San Francisco following the earthquake and fire in 1906 as well as for his service as chief engineer of the Providence, R. I., electric railway system, with which he was connected for the greater part of the time from 1907 to 1915.

Mr. Bronsdon was a native of San Francisco. His father constructed the first electric railway between Boston and Charlestown and also built the first electric railway on the Pacific Coast. It was on the coast that he had his first experience in engineering work. This was during the construction of the cable road in Los Angeles. In 1889 he became superintendent of the Providence Cable Tramway. He later was chief engineer at the Eddy Street power plant in Providence, having charge of the installation there. He later went to Duluth as designing and construction engineer of the Duluth-Superior Traction Company, and was afterward appointed engineer for the Old Colony Street Railway, Boston, Mass.

His next engagement was with the United Railroads, San Francisco, where he remained until March, 1907. He next became chief engineer of the Rhode Island Company, at that time operating the electric railways in Providence, R. I. For five years he continued in that post and then resigned to return to his home in California. Two years later he returned to the employ of the company at Providence, but about a year after this he retired from the company to accept appointment to the newly created office of deputy commissioner of public works of the city of Providence. His acceptance of this office marked the end of his active connection with electric railway affairs.

Clifton Colburn, treasurer and an organizer of the Nahant & Lynn Street Railway, Lynn, Mass., died Jan. 5. He was connected with the Nahant & Lynn Street Railway since its organization.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Fifty Gas-Electric Coaches Being Delivered to Detroit Railways

Complete delivery of 50 a.c.f. gas-electric double-deck coaches for the Department of Street Railways of the City of Detroit is expected by Jan. 31.

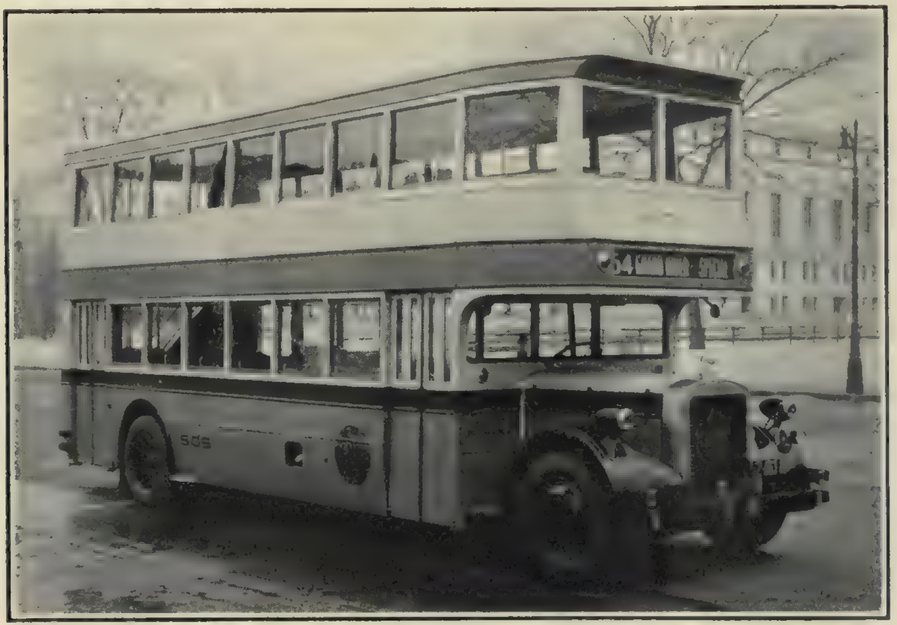
These coaches embody several unusual features, including equipment for either one-man or two-man operation and a complete inclosed stairway and upper deck, with an over-all height of only 12 ft. 8 in. They are the first of a recently announced line built by the American Car & Foundry Motors Company to be put in service. A six-cylinder, 90-hp. Hall-Scott engine, with 4¼-in. bore and 5½-in. stroke, comprises the power equipment. The electric drive, made by the General Electric Company, is of the type used in previous gas-electric buses. It consists of a generator connected directly to the engine, which produces current to operate the two series-wound electric motors, one of which is geared to each of the rear wheels. Westinghouse air brakes operating low carbon shoes against high carbon drums are provided on all four wheels. Electric braking also is provided by introducing a resistance grid into the circuits with the current flowing in reverse.

Front and rear passenger doors are controlled independently by pneumatic door engines, making it possible for the driver to operate the vehicle without the aid of a conductor. Both front and rear doors have treadle controls. They are also fitted with an outside conductor's air valve so the bus may be loaded from both ends at terminal or congestion points.

The frame is made from heat-treated alloy steel, the side rail sections having the maximum dimensions of 11-in. web 3-in. flange. The material is ¼ in. thick and the frame is reinforced for several feet through the section of maximum stress by pressing a $\frac{3}{16}$ in. reinforcement into the main rail, giving a maximum rail thickness of $\frac{7}{16}$ in. Pressed-steed channel cross-members are used to reinforce the frame. The front springs are 4 in. x 49 in., and the rear springs 5 in. x 64 in. Rear springs are equipped with bumper springs whose tips contract progressively under deflection. It is claimed that the unusual length and width of these springs gives a riding quality which is much better than has heretofore been achieved in double-deck coaches.

Each coach has 60 seats, 27 passengers being accommodated on the lower deck in Brill type, leather-upholstered seats which are provided with spring units in the bottom and back. On the upper deck 28 out of the 33 seats face outward over the monitor. Two seats are placed at the forward end of the monitor section, and three passengers can be seated in folding taxi chairs.

By economical use of space, the builders have obtained 6 ft. 4 in. headroom in the lower deck and 5 ft. 10 in. on the upper level. Ample lighting is supplied by nineteen 21 cp. lamps, operated from a double battery of six cells each built up with 21 plates.



One of the 50 Gas-Electric Coaches Which Are Being Delivered to the Detroit Street Railway System. They Are Designed for One or Two-Man Operation

Cars Being Rebuilt for One-Man Operation at Hampton, Va.

An extensive reconstruction and painting program has been started by the Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va. The platforms of 45 two-man double-truck cars are being remodeled to provide for one-man operation. These cars are to be equipped with all of the modern National Pneumatic and Safety Car devices. After the reconstruction work is completed each car will be painted with the standard Fitkin combination of colors. When completed the property will be operating on a 100 per cent one-man basis.

New Financial Interests Back Brown Boveri

Action of the stockholders of the American Brown Boveri Electric Corporation on Jan. 5 in electing to the directorate representatives of Blair & Company, Inc., the Central Union Trust Company, the Equitable Trust Company and Curtis & Sanger is taken as indicative of new and important financial interests having become identified with the corporation. The new board consists of fourteen members, as follows:

Clifford Bucknam, Pynchon & Company; James I. Bush, vice-president Equitable Trust Company; Allen Curtis, Curtis & Sanger, Boston; William M. Flook, representing the Anthony N. Brady Estate; Edward N. Goodwin, representing Brown, Boveri & Company, Ltd., Switzerland; William V. Griffin, representing the Anthony N. Brady Estate; James Imbrie, president Imbrie & Company; William F. Ingold, Pynchon & Company; Henry Lockhart, Jr., vice-president Blair & Company, Inc.; John J. Rudolf, A. Iselin & Company; Theodore G. Smith, vice-president Central Union Trust Company; Elisha Walker, chairman of the board and president of Blair & Company, Inc.; Frank R. Warton, formerly vice-president of the Allied Packers Company, and Laurence R. Wilder, president American Brown Boveri Electric Corporation.

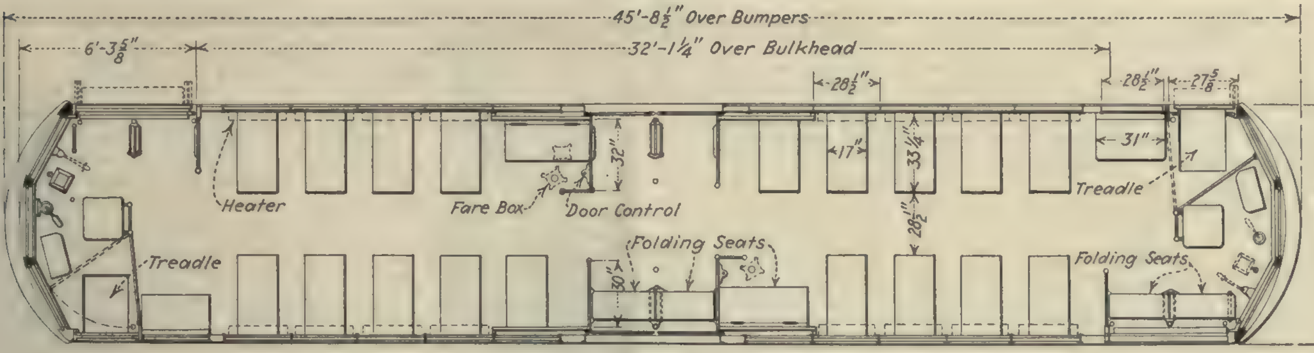
At the same meeting the following officers for the corporation were elected: Laurence R. Wilder, president; Clinton L. Bardo, Theodore Boveri, W. G. Groesbeck, Earl G. Hines and Frank R. Warton, vice-presidents; Norman R. Parker, comptroller, and J. T. Wickersham, secretary and treasurer.

Theodore Boveri, the son of the late Walter Boveri, one of the founders of Brown, Boveri & Company, Ltd., was for many years responsible for design and manufacture in the Baden, Switzerland, works of the company. His election as vice-president of the American Brown Boveri Electric Corporation in charge of engineering cements the working relations betwen the two interests.

New Standards Will Improve Lumber Trade

"Lumber stocks are as low as at any time in recent years," according to Wilson Compton, secretary and manager National Lumber Manufacturers Association. In spite of this Mr. Compton sees a bright outlook for 1927.

Writing in the *National Lumber Bulletin* Mr. Compton states that the national lumber trade extension program is not yet under way, but it is now expected to be on a scale of a minimum



Plan of Double-Truck Cars that Have Met with Much Favor in Dallas

of $1,000,000 a year for five years and will doubtless start during 1927.

"The consciousness of the lumber industry that it has at least reached such a degree of commercial intelligence and discipline that it is willing to inaugurate a great campaign for lumber is having an encouraging effect. The increasing observance and practice of American standards for lumber has paved the way for this campaign. The industry has put the manufacture, grading and merchandising of soft wood lumber, irrespective of species or region, upon a uniform basis, fair to the consumer, the distributor and producer. They indicate the dividing line between lumber manufactured from good timber, properly graded and sold for uses for which it is best fitted and lumber cut from inferior timber, roughly milled and poorly graded if at all."

New Cars Meeting with Good Response in Dallas

In May, 1926, an order was placed with the American Car Company, St. Louis, Mo., for 30 front-entrance, center-exit, double-truck cars to be used for city service on the Dallas Railway, Dallas, Tex. Delivery followed in approximately three months time, and since then the cars have been in regular operation, receiving very favorable comment from patrons of the company. They will accommodate 50 seated passengers, the front section being set aside for white passengers, while colored patrons use the rear. Treadle exits are provided at each end of the car.

The principal specifications are as shown in the following:

Bolster centers, length	26 ft. 11½ in.
Length over all	45 ft. 8½ in.
Truck wheelbase	5 ft. 1⅛ in.
Width over all	8 ft. 5 in.
Height, rail to trolley base	10 ft. 7¼ in.
Body	All steel
Interior trim	Mahogany
Roof	Arch
Air brakes	General Electric
Armature bearings	Sleeve
Bumpers	4-in. channel
Car signal system	Faraday
Car trimmings	Statuary bronze
Center and side bearings	Brill
Compressors	General Electric
Conduits and junction boxes	Fabric duck
Control	K35-JJ, double end
Curtain fixtures	Curtain Supply Co.
Curtain material	Wyandasote DC 85-77-1
Destination signs	Hunter
Door-operating mechanism	National Pneumatic
Energy-saving device	Economy meters
Fare boxes	Johnson
Fenders or wheelguards	American Car Co.
Finish	R. F. Johnson's Krakno
Gears and pinions	General Electric
Hand brakes	American Car Co., drop handles
Heater equipment	16 Consolidated Car Heating Co., truss plank
Headlights	"Golden Glow" SM-95
Journal bearings	Brill plain
Journal boxes	General Electric
Lightning arresters	General Electric
Motors	Four GE-265-A, inside hung
Sanders	Nichols-Lintern
Sash and fixtures	Curtain Supply Co.
Seats	Brill "Winner"
Seating material	Wood slats
Step treads	Feralun
Trolley catchers	Keystone
Trolley base	U. S. No. 13
Trolley wheels	U. S.
Trucks	Brill 177-E-1
Ventilators	Eight Utility
Wheels	Rolled steel, 26 in.

Safety Council's Calendar in Mails

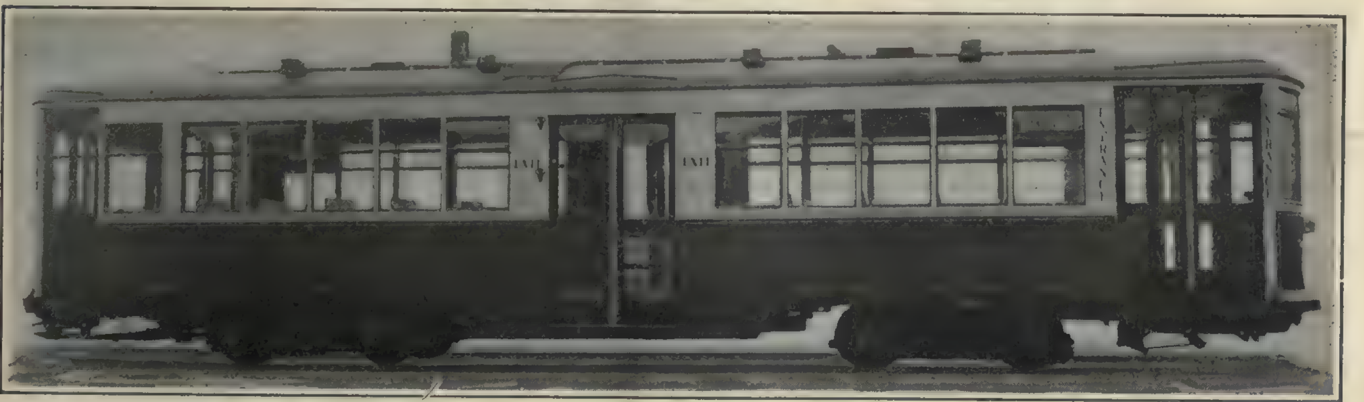
Suitable pictures and text characterize the 1927 calendar issued by the National Safety Council, Chicago, Ill. As usual, the pictorial features are about equally divided by the home and the factory. Special stress is laid in the text on the prevention of colds, local infections, heart disease, Bright's disease, headaches and the contagious diseases of childhood. Care of the eyes also is stressed.

Giant Order for Rectifiers Placed by Connecticut Company

The Connecticut Company has arranged for the purchase of mercury-arc rectifiers and all auxiliary equipment for its Bridgeport and Stratford 600-volt traction service substations. Orders for this material were placed with the American Brown Boveri Electric Corporation recently and were brought about by the decision of the company to shut down its power stations and secure energy from the New York, New Haven & Hartford Railroad, which operates an 11,000-volt, single-phase railroad between New York City and New Haven, Conn.

Installation at Bridgeport will comprise five manually controlled units, aggregating 6,000 kw. capacity. This is the largest mercury-arc rectifier installation both in number of units and total capacity in the United States. The Stratford substation will employ two full automatic units toaling 2,400 kw. capacity. A unique feature of this project is that all equipment is designed for operation at any of the following a.c. supplies: 13,900 volts, 60 cycles; 11,400 volts, 25 cycles; 6,600 volts, 60 cycles; and that the shifting from one to another may be accomplished with no appreciable equipment change.

It is claimed that the selection of this equipment has many advantages in that operating flexibility is provided without the heavy equipment replacement costs which would be necessary were other types of converting apparatus chosen; high efficiency over the entire working range characteristic of this type of conversion; and the economic light construction of substations is permitted by the low-weight, vibrationless equipment.



A Snappy Exterior Which Is Typical of the New Rolling Stock Delivered to Dallas Railway

Larger Buses in 1927 Forecast

In the opinion of Roy A. Hauser, manager bus department Mack Trucks, Inc., "the trend of bus development seems to be toward larger and more luxurious vehicles. With many of the smaller operators who were not financially able to take the risk of feeling the public's pulse retiring from the field, this is quite natural," said Mr. Hauser. "The big minds behind transportation systems have this courage, backed by financial ability; it is only natural, therefore, that the primary law of transportation, to the effect that cost per unit decreases with increase in number of units carried per vehicle, should assert itself."

Capper-Kelley Bill Denied Further Hearing

According to latest advices from Washington the Capper-Kelley bill, designed to permit the manufacturers of branded products to fix the resale price, has been denied further consideration by the committee on interstate and foreign commerce. "There is no probability," says the Washington report, "that anything further will be done on the bill at this session of Congress. While the measure has been strongly supported and has created considerable controversy for more than ten years, it has made no legislative progress in that time."

Miami Causeway Tracks Nearly Completed

Miami Beach Railway, Miami, Fla., through its president, A. L. Reynolds, announces completion of the double-track reconstruction work over the causeway from Miami to the plant of the Miami Beach Railway Company, east of Star Island. The remaining section of track covering the distance from the plant to the Miami Chamber of Commerce Building will be in operation in a short time. This reconstruction work was necessitated by the recent hurricane damage.

New York Car Wheel Company Disposes of Hammond Plant

The Hammond plant of the New York Car Wheel Company of Indiana has been purchased by the Southern Car Wheel Company of Pittsburgh, which is controlled by the Mellon interests. Negotiations for the sale were closed last week and the new management has already taken charge. The sale does not affect the Buffalo plant of the New York Car Wheel Company. No changes in the executive personnel of the wheel plant have been made.

Rolling Stock

Twin City Rapid Transit Co., Minneapolis, is including in its street railway expansion program the purchase of 25 new street cars of the noiseless type to cost $155,000. It is understood that the new equipment will be operated both in St. Paul and Minneapolis.

Metal, Coal and Material Prices

Metals—New York	Jan. 18, 1927
Copper, electrolytic, cents per lb.	13.025
Copper wire, cents per lb.	15.25
Lead, cents per lb.	7.63
Zinc, cents per lb.	6.88
Tin, Straits, cents per lb.	66.375
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$5.325
Somerset mine run, Boston, net tons	2.575
Pittsburgh mine run, Pittsburgh, net tons	2.125
Franklin, Ill., screenings, Chicago, net tons	1.875
Central, Ill., screenings, Chicago, net tons.	1.425
Kansas screenings, Kansas City, net tons	2.35
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$5.50
Weatherproof wire base, N. Y., cents per lb.	17.00
Cement, Chicago net prices, without bags	2.10
Linseed oil (5-bbl. lots), N. Y., cents per lb.	11.00
White lead in oil (100-lb. keg), N. Y., cents per lb.	14.50
Turpentine (bbl. lots), N. Y., per gal.	$0.81

Track and Line

Georgia Railway & Power Company was recently granted permission by the Council of Atlanta, Ga., to lay its tracks on Bell Street, thus connecting the Decatur and Hunter Streets lines. With this connection the company plans to improve service on its Soldiers' Home-English Avenue line, which is now compelled to operate in both directions by a single track on Grant Street, a thoroughfare that is not wide enough for a double-track line.

Trade Notes

Westinghouse Electric & Manufacturing Company has appointed James A. Davies general superintendent of the South Philadelphia Works. The promotion was announced by H. T. Herr, vice-president in charge of operations, and was effective as of Jan. 7. Mr. Davies, who has been assistant general superintendent for the past eight years, was appointed to fill the position made vacant by the death, at Atlantic City, of H. M. Giles. The new general superintendent has a service record of seventeen years in the employ of the Westinghouse organization.

National Pneumatic Company, New York City, manufacturer of door and step controlling mechanisms for street railway cars, will occupy quarters in the Graybar Building, which it is expected will be ready for occupancy April 1.

Frank Metzger, manager of sales of the Standard Steel Works Company, Philadelphia, Pa., has been elected vice-president to succeed Richard Sanderson, resigned. R. Nevin Watts succeeds Mr. Metzger as manager of sales, with headquarters at Philadelphia.

J. D. Elsom for twelve years with the Economy Electric Devices Company, will represent the Johnson Fare Company in sales in the Central Western states. Mr. Elsom has formed the Illinois Motive Equipment Company, with headquarters in the Pure Oil Building, Chicago.

Armco Culvert Manufacturers' Association is the new name for the Armco Culvert and Flume Manufacturers' Association of Middletown, Ohio, effective Jan. 1.

Shops and Buildings

Portland Electric Power Company, Portland, Ore., has just placed a contract with the Austin Company, Cleveland, Ohio, for a large garage to house its trucks. The new garage will be 100 ft. wide with all interior columns eliminated. The structure will be 240 ft. long with a clear height of 14 ft. The building will be modern in every respect. Usually industrial as well as other construction is of timber in the Northwest. In this case 120 tons of structural steel will be employed. All sash will be of the modern steel type with ventilating sections. Special repair and greasing pits will be installed, having a newly developed ventilating and lighting system which has been designed by Austin engineers.

Indiana Service Corporation, Fort Wayne, Ind., is drawing up preliminary plans for the construction of an office building and terminal station at Fort Wayne, Ind, to cost $250,000.

New Advertising Literature

Timken Roller Bearing Company, Canton, Ohio, is presenting in booklet form "Recent Developments in the Application of Tapered Roller Bearings in Machine Tools," a study recently read before the machine tool section of the A.S.M.E. by S. M. Weckstien, M. E., industrial equipment engineer of the company. Comprehensive text matter and illustrations make this study a valuable addition to the manufacturer's library. Copies of the paper may be obtained by addressing the industrial equipment division of the company.

D. P. Frampton & Company, Pittsburgh, Pa., has just issued an attractive bulletin outlining the Frampton tie plugs.

Driver-Harris Company, maker of special alloys, Harrison, N. J., is now distributing a single-month calendar for the New Year, which advertises their Nichrome wire. The calendar is decorated with a humorous drawing which drives home the advertising thought.

Carnegie Library, Pittsburgh, Pa., has issued a bibliography on manganese steel, which was assembled by E. H. McClelland and Victor S. Polansky. The bibliography is in booklet form and has a preface by Sir Robert Hadfield, the inventor of manganese steel.

Electric Railway Equipment Company, Cincinnati, Ohio, has issued a leaflet listing the advantages of "Elreco" tubular steel poles. These poles fulfill a three or fourfold purpose in supporting trolley span wires, ornamental lighting brackets, lighting circuit wires, and even traffic signals.

Hoyt Metal Co., St. Louis Mo., has issued a pamphlet giving complete babbitt metal data. It contains much information of value to users of babbitt metal, embodying as it does sections dealing with the selection and handling of the metal, considerations in the design of babbitt bearings and a table giving results of laboratory tests.

PEACOCK

Reg. U. S. Pat. Off.

STAFFLESS BRAKES

Merited confidence is the reason that Peacock Staffless Brakes are included in the specifications of nearly all modern cars. Confidence which is justified by many satisfactory years of service—by a brake that has three times the braking power of ordinary hand brakes—occupies minimum platform space—has almost unlimited chain-winding capacity—up to 144 inches, if necessary—low installation and maintenance costs—simple to operate and is liked by motormen!

We will gladly furnish you with facts and figures of what they have done for others and what they will do for your modern cars.

NATIONAL BRAKE CO., Inc.

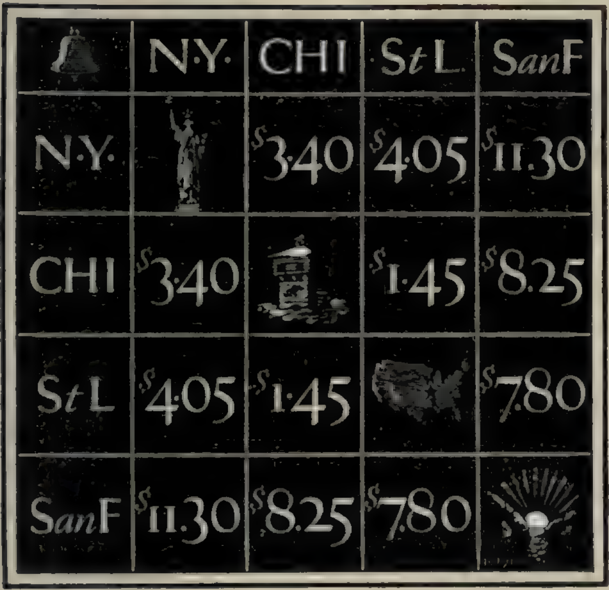
890 Ellicott Square, Buffalo, N. Y.

An increasingly large portion of the actual income derived from car card advertising service must be devoted to building and maintaining the prestige of car card advertising in the face of the active competition of all other media.

Creating and protecting our mutual interest is a costly item.

Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

A *saving of* $3,000,000 in long distance charges



	N·Y·	CHI	St L	San F
N·Y·		$3.40	$4.05	$11.30
CHI	$3.40		$1.45	$8.25
St L	$4.05	$1.45		$7.80
San F	$11.30	$8.25	$7.80	

BY THE RECENT READJUSTMENT in long distance rates, it is calculated that telephone users will save $3,000,000 annually. Interstate and intersectional rates are substantially lower. The greater the distance, the greater the reduction. Here are typical station-to-station day rates, old and new: New York to Pittsburgh, formerly $2.10; now $1.70. Chicago to Boston, $5.45—$3.95. Atlanta to San Francisco, $13.65—$9.40.

IN ADDITION TO THESE nation-wide rate changes, several new service conveniences are offered. The privilege of "reversing the charges," for example, formerly applied only to person-to-person calls. This has now been extended to include station-to-station calls—a substantial saving and a real convenience to thousands of business men.

Those who wish to take advantage of the lowest long distance rates of the twenty-four hours may now do so beginning at 8:30 P. M. From this hour to 4:30 A. M., station-to-station rates are about fifty per cent of day rates. Now, more than ever, long distance calls are useful in the development of business. Thousands now use the telephone nationally. By telephone you can make a week's trip in a few minutes. Is there a distant call that would clear up some troublesome transaction? It probably would cost less than you think. . . . *Number, please?*

BELL LONG DISTANCE SERVICE

You are your Credit Man When it comes to **Buying** *Orders*

THE orders you take come under the watchful eye of the credit man.

How about the orders your company places—the orders that you make?

If the reliability of the manufacturer is checked when you sell it should be checked when you buy.

Whether his is a dependable source of purchase is important to learn before—not after his products are in your plant.

What can you expect in the way of prompt and continuous deliveries?

What about quality uniformity?

Has he the ability to finance your orders?

* * *

A reliable aid is here—in this publication. Most of the manufacturers in this issue have been running their advertising in this publication continuously year after year.

They are established. They do not advertise something they cannot deliver. They cannot deliberately exaggerate product merit or institutional service.

Why? Because this publication is A.B.P.—meaning it is a member of the Associated Business Papers. This means, broadly, that this publisher has that basic A.B.P. requirement—integrity.

If a product you need is not advertised in this publication, ask the publisher to direct you to a reliable source.

This publication is a member of

The ASSOCIATED BUSINESS PAPERS, Inc.

An association of none but qualified publications reaching
the principal fields of trade and industry

Executive Offices: 220 West 42nd Street, New York, N. Y.

KUDHA MAISTREE

In China the New Year is a time for ceremonious observance.

The kudha maistree, or kitchen god, is smeared with New Year Taffy to sweeten his temper, so that when he goes up as an offering he carries a good report.

So with much the same spirit, we send out this Morganite offering from our old Kitchen address, to carry to you

This kindly New Year REPORT:

The NEW Morganite plant at Long Island City is completed.

We've now moved in.

It's just across the bridge from the old location.

15 short minutes from 42nd St.

A nickel ride.

New Machinery, new building, new enthusiasm.

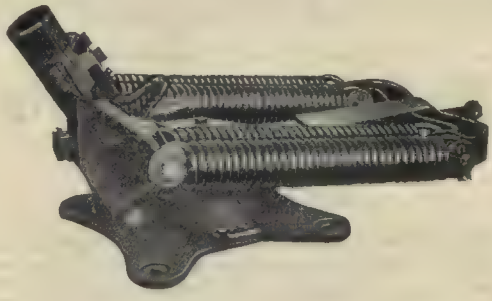
Drop in and see the best there is in brush making.

Before you forget, just dictate these few words to your favorite steno:

3302-3320 ANABLE AVE.,
LONG ISLAND CITY, N. Y.

is the new address of

Morganite Brush Co., Inc.



Nuttall US 20-A Timken Roller Bearing Trolley Base

Grease 'er Twice a Year And Let 'er Go

You have smiled for years at the original feller in Coatesville who tells you to "Hook 'er to the Biler"—that's *amusement.*

But if you want to wear the smile of *genuine satisfaction*, and see that smile on every conductor's face—on every face around the car barn, here's a sure fire prescription:

Put on some Nuttall US 20-A Trolleys. It is literally true that you can lubricate them twice a year and forget them. They swivel on Timken Tapered Roller Bearings, and you know what they are. Every wearing part is hardened, and you can forget wear. Heavy shunts conduct the current around bearings and moving parts, so you can forget arcing troubles. All in all, what could be sweeter?

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA
1927

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

Bankers and Engineers

Ford, Bacon & Davis
Incorporated
Engineers
115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

The J. G. White Engineering Corporation
Engineers—Constructors
Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.
43 Exchange Place New York

STONE & WEBSTER
Incorporated
EXAMINATIONS REPORTS APPRAISALS
ON
INDUSTRIAL AND PUBLIC SERVICE PROPERTIES
New York Boston Chicago

THE BEELER ORGANIZATION
ENGINEERS AND CONSULTANTS
Traction - Traffic - Equipment - Power Investigations
TRANSPORTATION, TRAFFIC, AND OPERATING SURVEYS
COORDINATING SERVICE—FINANCIAL REPORTS
APPRAISALS—MANAGEMENT
52 Vanderbilt Ave. New York

SANDERSON & PORTER
ENGINEERS
PUBLIC UTILITIES & INDUSTRIALS
Design Construction Management
Examinations Reports Valuations
CHICAGO NEW YORK SAN FRANCISCO

ENGELHARDT W. HOLST
Consulting Engineer
Appraisals Reports Rates Service Investigations
Studies on Financial and Physical Rehabilitation
Reorganization Operation Management
683 Atlantic Ave., BOSTON, MASS.

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER, MASSACHUSETTS
REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

KELKER, DeLEUW & CO.
CONSULTING ENGINEERS
REPORTS ON
Operating Problems Valuations Traffic Surveys
111 W. Washington Street, Chicago, Ill.

C. B. BUCHANAN, President
W. H. PRICE, JR., Sec'y-Treas.
JOHN F. LAYNG, Vice-President
BUCHANAN & LAYNG CORPORATION
Engineering and Management, Construction, Financial Reports, Traffic Surveys and Equipment Maintenance
BALTIMORE
1904 Citizens National Bank Bldg.
Phone: Hanover: 2142
NEW YORK
49 Wall Street

DAY & ZIMMERMANN, INC.
ENGINEERS
DESIGN - CONSTRUCTION - REPORTS
VALUATIONS - MANAGEMENT
NEW YORK PHILADELPHIA CHICAGO

HEMPHILL & WELLS
CONSULTING ENGINEERS
Gardner F. Wells Albert W. Hemphill
APPRAISALS
INVESTIGATIONS COVERING
Reorganization Management Operation Construction
43 Cedar Street, New York City

STEVENS & WOOD
INCORPORATED
ENGINEERS AND CONSTRUCTORS
120 BROAWAY, NEW YORK
ENGINEERING CONSTRUCTION YOUNGSTOWN, O. FINANCING MANAGEMENT

WALTER JACKSON
Consultant on Fares and Motor Buses
The Weekly and Sunday Pass—Differential Fares—Ride Selling
143 Crary Ave., Mt. Vernon, N. Y.

McCLELLAN & JUNKERSFELD
Incorporated
ENGINEERING AND CONSTRUCTION
Examinations—Reports—Valuations
Transportation Problems—Power Developments
68 Trinity Place, New York
Chicago St. Louis

Transmission Line and Special Crossing Structures, Catenary Bridges
WRITE FOR OUR NEW DESCRIPTIVE CATALOG
ARCHBOLD-BRADY CO.
Engineers and Contractors SYRACUSE, N. Y.

Byllesby Engineering & Management Corporation
231 S. La Salle Street, Chicago
New York San Francisco

THE BABCOCK & WILCOX COMPANY
85 LIBERTY STREET, NEW YORK

Builders since 1868 of Water Tube Boilers of continuing reliability

BRANCH OFFICES
BOSTON, 49 Federal Street
PHILADELPHIA, Packard Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
PHOENIX, ARIZ., Heard Building
DALLAS, TEX., 2001 Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., 805 Gasco Building

WORKS
Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

BRANCH OFFICES
DETROIT, Ford Building
NEW ORLEANS, 344 Camp Street
HOUSTON, TEXAS, 1011-13 Electric Building
DENVER, 444 Seventeenth Street
SALT LAKE CITY, 405-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building

Type R-11
Double Register

International Registers

Made in single and double types to meet requirements of service. For hand or foot, mechanical or electric operation. Counters, car fittings, conductors' punches.

The International Register Co.
15 South Throop Street, Chicago, Illinois

THE WORLD'S STANDARD
"IRVINGTON"

Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slott Insulation Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.
Irvington, N. J.
Sales Representatives in the Principal Cities

THE P. EDWARD WISH SERVICE
50 Church St. NEW YORK
Street Railway Inspection DETECTIVES
131 State St. BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

Our advertisement in the issue of January 15 showed how
HASKELITE and PLYMETL
are being regularly used to improve old equipment.
Another ad will appear February 5.
HASKELITE MANUFACTURING CORPORATION
133 W. Washington St., Chicago, Ill.

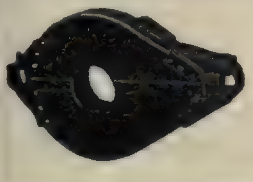
Adapted to all Types of rails and paving.

GODWIN
Steel Paving Guards
Proven by service to economically prevent seepage and disintegration of street railway paving.
Write for Illustrated Catalog No. 20
W. S. GODWIN CO., Inc.
Race and McComas St., Baltimore, Md.

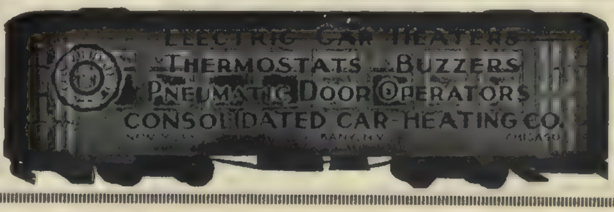
Hale and Kilburn SEATS
Better Quality Seats For Cars and Buses
Hale-Kilburn Co.
1800 Lehigh Ave., Philadelphia, Pa.

UNA
RAIL BONDS-RAIL JOINTS
DYNAMOTORS
WELDING ROD
UNA Welding & Bonding Co.
Cleveland, Ohio

Coin Counting and Sorting Machines
FARE BOXES
Lever-Operated and Slip Change Carriers
The Cleveland Fare Box Co.
Cleveland, Ohio
Canadian Cleveland Fare Box Co., Ltd., Preston, Ont.



CHILLINGWORTH
One-Piece Gear Cases
Seamless—Rivetless—Light Weight Best for Service—Durability and Economy. *Write Us.*
Chillingworth Mfg. Co.
Jersey City, N. J.



If space is valuable—

—where you store
or repair
street cars—

—where buses are
garaged—washed
—repaired or
loaded—

You can increase your capacity without construction of new or additions to old buildings—without installation of expensive special trackwork! How? With **Easton Turntables!**

You can get it! No need for wasting garage space in backing around buses—in infrequently used washing stands—nor in wasting mechanics' time in servicing buses owing to poor light, accessibility of tools, etc! No need for wasting valuable space in terminals and bus starting when you can turn the buses in their own length! How can you effect all these savings? Install **Easton Turntables!**

Let us show you how to release valuable space and facilitate work by means of a small investment. Don't back around—*turn* around!

EASTON CAR & CONSTRUCTION CO.
EASTON, PA.
New York Pittsburgh Kansas City Chicago San Francisco Philadelphia

EASTON TURNTABLES

Whatever your requirements

specify

Le Carbone Carbon
Brushes

They talk for themselves

W. J. Jeandron
Hoboken Factory Terminal,
Building F, Fifteenth Street, Hoboken, N. J.
Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street
Canadian Distributors: Lyman Tube & Supply Co., Ltd.
Montreal and Toronto

PANTASOTE
Trade Mark
Seat and Curtain Materials
There is no substitute for Pantasote

AGASOTE
Trade Mark
Roofing—Headlining—Wainscoting
The only homogeneous panel board

*standard
for electric railway cars
and motor buses*

The PANTASOTE COMPANY Inc.
At 46th Street 250 Park Avenue
NEW YORK
Pantasote Products
for Both
ELECTRIC RAILWAYS
AND
BUSES

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches	$4.50 an inch
4 to 7 inches	4.30 an inch
8 to 14 inches	4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

POSITIONS VACANT

WELDING foreman for thermit and electric welding, grinding, and cutting on city and interurban track work. To handle gang of six or eight men. Straight time position. Start at $125 per month. Headquarters in large Middle Western city. Give age, education, previous experience and how soon you can report for work P-963, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

POSITIONS WANTED

SUPERINTENDENT of rolling stock, 24 years' experience, open for position. PW-960, Electric Railway Journal, Tenth Ave. at 36th St., New York.

TRANSPORTATION official available. Broad experience, successful record, city and interurban properties, recognized ability, progressive, efficient, successful in handling labor. Public relations, traffic problem, selling transportation, increasing revenue. Fine references. PW-961, Electric Railway Journal, Guardian Bldg., Cleveland, Ohio.

SALESMAN AVAILABLE

LET ME put on your preferred stock customer ownership sale. Can successfully conduct campaign of any size and handle both sales and accounting details. Wide experience. Highest of references. SA-964, Electric Railway Journal, 7 So. Dearborn Street, Chicago, Ill.

REPRESENTATIVE AVAILABLE

Sales Representative

With several years successful sales experience in the steam and electrical railway field—desires change. Familiar with all mechanical, electrical, and automotive lines. Wide acquaintance, excellent character references, and can sell. Would like to hear from supply house, bus manufacturers, or sales company. RA-962, Electric Railway Journal, Tenth Ave. at 36th Street, New York.

AIR COMPRESSORS

12 General Electric CP-27.
6 General Electric CP-28.
16 Westinghouse DH-16.

IRVING S. VAN LOAN CORPORATION
1750 Broadway, New York City

Specialists in street cars or any part of a street car.

Illustrated bulletin supplied on request.

FOR SALE

15 BIRNEY SAFETY CARS

Brill Built

West. 508 or G. E. 264 Motors
Cars Complete—Low Price—Fine Condition

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

SAVE 30% TO 50% ON

RAILS-LOCOMOTIVES-CARS

Economy—Service
Quality—Reliability

HYMAN-MICHAELS COMPANY

Peoples Gas Bldg., Chicago

ST. LOUIS — DALLAS — LOS ANGELES
SAN FRANCISCO — PORTLAND — SEATTLE

ENGINES

and Miscellaneous Electrical Equipment

All in first class operating condition

1—Westinghouse Automatic Compound Engine, 200 hp., belt connected to one 150 kw. D.C. Generator, 550 volt, made by the National Electric Company.

1—Westinghouse Automatic Compound Engine, 350 hp., direct connected to Westinghouse 150 kw. D.C. Generator, 550 volt.

5—Feeder and Distribution Panels, Blue Vermont Marble, with Ammeters, Voltmeters, Circuit Breakers, Switches, etc. for above apparatus.

1—Rotary Converter, made by General Electric Company, 300 kw., 600 volts, 500 amps. D. C., A.C. side 60 cycle, 6 phase.

1—Commutator for Rotary Converter (New).

3—110 kw. Transformers 13,200/11,880 Primary, Secondary 430/286/143, together with Panels, Starting Switch and Reactance, Circuit Breaker, Ammeter, Voltmeter, Rheostat, etc.

Peekskill Lighting & Railroad Co.
Ossining, New York

2—Modern Rotary Converters—In Ohio

G. E. HCC, 600 volts D.C., 300 kw., 1200 r.p.m., Form P, 60 cycle, 3 phase, switchboard, outdoor transformers, 13200 volts primary, switching equipment. IN EXCELLENT OPERATING CONDITION.

Full details will be furnished promptly.

THE DAYTON, COVINGTON & PIQUA TRACTION CO.
Wirt Kessler, T. Russell Robinson, Receivers, Room 701 — 1 State Street, Boston, Mass.

If there is anything you want—

or something you don't want that *other* readers of this paper can supply—or use—advertise in the

SEARCHLIGHT SECTION

Somebody is always looking for something to meet certain business needs. Some men in charge of plant operations may be in the market for good used equipment—others may have just what they want, to sell. Some may require a man of unusual qualifications for a particular position—that man may be another reader of this paper!

Put the Searchlight Section to work for you under any of the following classifications—to fill your business needs.

Agencies Wanted
Agents Wanted
Auction Notices
Buildings For Sale
Business Opportunities
Civil Service Opportunities
Contracts To Be Let
Contracts Wanted
Educational Courses
Employment Agencies
Exchanges
For Rent Items
Franchises
Industrial Sites
Miscellaneous Wants
New Industries Wanted
Partners Wanted
Patents For Sale
Patent Attorneys
Plants For Sale
Positions Vacant
Positions Wanted
Property For Sale
Receivers' Sales
Representatives Wanted
Salesmen Wanted
Work Wanted
Etc., Etc., Etc.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Westinghouse Air Brake Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M Co.

Armature Shop Tools
Columbia Machine Works
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Cincinnati Car Co.
National Ry., Appliance Co.
Westinghouse E. & M. Co.

Axles, Front
Shuler Axle Co.

Axles, Steel
Carnegie Steel Co.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Barges, Steel
American Bridge Co.

Bearings
Ahlberg Bearing Co.

Bearings and Bearing Metals
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
General Electric Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Cincinnati Car Co.
Columbia Machine Works
Stucki Co., A.

Bearings, Roller
Timken Roller Bearing Co.

Bells and Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.

Benders, Rail
Railway Trackwork Co.

Bodies, Bus
Brill Co., The J. G.

Body Material, Haskelite and Plymetl
Haskelite Mfg. Corp.

Boilers
Babcock & Wilcox Co.

Bond Testers
Electric Service Supplies Co.

Bonding Apparatus
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co

Bonds, Rail
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Braces, Timber
Duff Mfg. Co.

Braces, Trench
Duff Mfg. Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
American Bridge Co.
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
Cincinnati Car Co.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
American Brake Shoe & Foundry Co.
Bemis Car Truck Co.
Brill Co., The J. G.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co
Brill Co. The J. G.
Cincinnati Car Co.
General Electric Co.
National Brake Co.
Westinghouse Tr. Br. Co.

Brakes, Magnetic Rail
Cincinnati Car Co.

Bridges, Steel
American Bridge Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
LeCarbone Co
Morganite Brush Co.
Westinghouse E. & M. Co.

Brushes, Graphite
Morganite Brush Co.

Brushholders
Columbia Machine Works

Buildings, Steel
American Bridge Co.

Bulkheads
Haskelite Mfg. Corp.

Bunkers, Steel
American Bridge Co.

Bus Wheels, Steel
Heywood-Wakefield Co.

Buses
Brill Co., The J. G.

Buses, Motor
Graham Bros.
Studebaker Corp. of America

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works

Cables (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.

Car Steps, Safety
Cincinnati Car Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co.

Cars, Gas-Electric
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

Cars, Gas, Rail
Brill Co., The J. G.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
Wason Mfg. Co

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Brill Co., The J. G.
General Electric Co.

Castings, Brass Composition or Copper
Cincinnati Car Co.

Castings, Gray Iron and Steel
American Brake Shoe & Fdry. Co.
American Bridge Co.
American Steel Foundries
Bemis Car Track Co.

Castings, Malleable & Brass
American Brake Shoe & Fdry. Co.
Bemis Car Truck Co.

Catchers and Retrievers, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceiling Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Ceilings, Plywood, Panels
Haskelite Mfg Corp.

Chairs, Parlor Car
Heywood-Wakefield Co.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.

Change, Trays
Cincinnati Car Co.

Circuit-Breakers
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Westinghouse E. & M. Co.
Ohio Brass Co.

Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.

Clusters and Sockets
General Electric Co.

Coil Banding and Winding Machines
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Coils, Armature and Field
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Counting Machines
Cleveland Fare Box Co.
International Register Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

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Columbia Machine Works
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
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General Electric Co.
Westinghouse E. & M. Co.

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General Electric Co.
Westinghouse Tr. Br. Co.

Condensers
General Electric Co.
Westinghouse E. & M. Co.

Condensor Papers
Irvington Varnish & Ins. Co.

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Columbia Machine Works
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.

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General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

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General Electric Co.
Westinghouse E. & M. Co.

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American Bridge Co.

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American Brass Co.
Anaconda Copper Mining Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co.
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
Samson Cordage Works

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

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Electric Service Supplies Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossings
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Wm. Wharton, Jr. & Co.

Crossings, Frogs & Switches
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Wm. Wharton, Jr. & Co.

Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Crossings, Track (See Track Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

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Pantasote Co., Inc.

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Electric Equipment Co.
Hyman-Michaels Co.
Kessler, Wirt
Peekskill Lighting & R. R. Co.
Robinson, T. Russell
Van Loan Corp., Irving S.

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Elec. Service Supplies Co.

Detective Service
Wish-Service, P. Edward

Door Operating Devices
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Cincinnati Car Co.
Consolidated Car Heating Co.
National Pneumatic Co.

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Brill Co., The J. G.
Cincinnati Car Co.
General Electric Co.
Hale-Kilburn Co.

Doors, Folding Vestibule
National Pneumatic Co.

Drills, Track
Electric Service Supplies Co.
Ohio Brass Co.

Dryers, Sand
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Ears
Columbia Machine Works
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

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Electric Transmission Towers
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Byllesby Co., H. M.
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Jackson, Walter
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McClellan & Junkersfeld
Richey, Albert S.
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Stevens & Wood
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White Eng. Corp., The J. G.

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Waukesha Motor Co.

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National Railway Appliance Co.

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Floors
Haskelite Mfg. Corp.

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Brill Co., The J. G.
Cincinnati Car Co.
Duff Mfg. Co.

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Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Frogs, Track (See Track Work)

Frogs, Trolley
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Westinghouse E. & M. Co.

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American Bridge Co.

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Harps, Trolley
Columbia Machine Works
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(Continued on page 34)

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Poles, Ties, Posts, Piling & Lumber
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Poles, Trolley
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R. D. Nuttall Co.
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Brill Co., The J. G.
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Shovels, Power
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Elec. Service Supplies Co.
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Wood Co., Chas. N.
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Cincinnati Car Co.
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Steps, Car
Brill Co., The J. G.
Cincinnati Car Co.
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Babcock & Wilcox Co.
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Elec. Service Supplies Co.
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Westinghouse E. & M. Co.
Strand
Roebling's Sons Co., J. A.
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Superheaters
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Sweepers, Snow (See Snow Plows, Sweepers and Brooms)
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Switches and Switchboards
Consolidated Car Heating Co.
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General Electric Co.
Westinghouse E. & M. Co.
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Ramapo-Ajax Corp.
Switches, Track (See Track Special Work
Tampers, Tie
Railway Trackwork Co.
Tapes and Cloths (See Insulating Cloth, Paper and Tape)
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Smith Heater Co., Peter
Ticket Choppers and Destroyers
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Godwin Co., Inc., W. N.
Ties, Wood Cross (See Poles, Ties, Posts, etc.)
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Westinghouse E. & M. Co.
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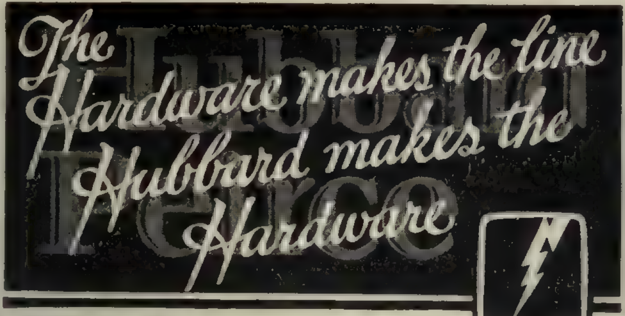

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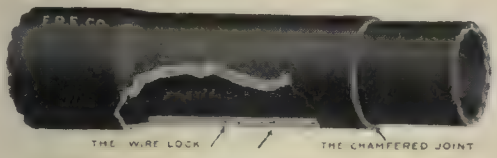

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ALPHABETICAL INDEX TO ADVERTISEMENTS

Page

A

Ahlberg Bearing Co.......Insert 14
American Brake Shoe & Foundry. 16
American Brass Co., The....... 37
American Bridge Co........... 33
American Car Co............38-39
American Electrical Works..... 35
American Steel Foundries 6
American Tel. & Tel. Co....... 25
Anaconda Copper Mining Co.... 37
Archbold-Brady Co. 28

B

Babcock & Wilcox Co......... 29
Beeler Organization 28
Bemis Car Truck Co........... 35
Bethlehem Steel Co........... 10
Brill Co., The J. G..........38-39
Buchanan & Layng Corp....... 28
Buda Co., The................ 33
Byllesby Eng. & Management Corp. 28

C

Cameron Electrical Mfg. Co.... 37
Carnegie Steel Co............. 33
Chillingworth Mfg. Co........ 29
Cincinnati Car Co............. 19
Cleveland Fare Box Co........ 29
Collier, Inc., Barron G......... 24
Consolidated Car Fender Co.... 37
Consolidated Car Heating Co.... 29

D

Day & Zimmermann, Inc....... 28
Dayton, Covington & Piqua Traction Co. 31
Differential Steel Car Co., The.. 35
Duff Manufacturing Co., The... 37

E

Easton Car & Construction Co.. 30
Electric Equipment Co........ 31
Electric Ry. Equipment Co..... 35
Electric Service Supplies Co.... 9

Page

F

Ford, Bacon & Davis.......... 28
"For Sale" Ads............... 31

G

General Electric Co..22, Back Cover
Godwin Co., Inc., W. S........ 29
Gold Car Heating & Ltg. Co.... 37
Graham Bros. 20-21

H

Hale-Kilburn Co. 29
Haskelite Mfg. Corp........... 29
"Help Wanted" Ads........... 31
Hemphill & Wells 28
Heywood-Wakefield Co......... 17
Holst, Englehardt W........... 28
Hubbard & Co. 35
Hyman-Michaels Co........... 31

I

International Register Co...... 29
Irvington Varnish & Insulator Co. 29

J

Jackson, Walter 28
Jeandron, W. J................ 30

K

Kelker, DeLeuw & Co......... 28
Kessler, Wirt 31
Kuhlman Car Co...........38-39

Page

L

LeCarbone Co................ 30
Lorain Steel Co............... 33

M

McClellan & Junkersfeld 28
Morganite Brush Co........... 27

N

Nachod and U. S. Signal Co.... 37
National Brake Co............ 23
National Pneumatic Co........ 15
National Ry. Appliance Co..... 33
Naugle Pole & Tie Co......... 37
Nuttall Co., R. D............. 27

O

Ohio Brass Co................ 5
Okonite-Callender Cable Company, Inc., The............. 35
Okonite Co., The............. 35

P

Pantasote Co., Inc............ 30
Peekskill Lighting & R. R. Co... 31
Perey Mfg. Co., Inc........... 37
Positions Wanted and Vacant... 31

R

Railway Track-work Co....... 37
Railway Utility Co........... 37
Ramapo Ajax Corp........... 37
Richey, Albert 28
Robinson, T. Russell 31
Roebling's Sons Co., John A.... 37

Page

S

Samson Cordage Works 37
Sanderson & Porter 28
Searchlight Section........... 31
Shuler Axle Co............... 18
Smith Heater Co., Peter....... 37
Star Brass Works............ 35
Stevens & Wood, Inc......... 28
Stone & Webster 28
Stucki Co., A................ 37
Studebaker Corp. of America, The ....Insert 12-13

T

Tool Steel Gear & Pinion Co., The 8

U

Una Welding & Bonding Co..... 29
Universal Lubricating Co...... 35

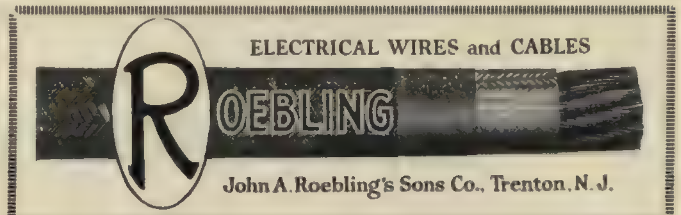
V

Van Loan Corp., Irving S...... 31

W

"Want" Ads 31
Wason Mfg. Co............38-39
Waukesha Motor Co......Insert 11
Westinghouse Traction Brake Co. 4
Westingsouse Traction Brake Co. 4
Wharton, Jr. & Co., Inc., Wm... 33
"What and Where to Buy", 32-34
White Eng. Corp., The J. G.... 28
Wish Service, The P. Edw..... 29
Wood Co., Chas. N............ 37

Chapman
Automatic Signals
Charles N. Wood Co., Boston



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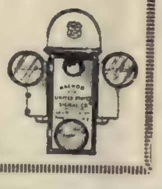

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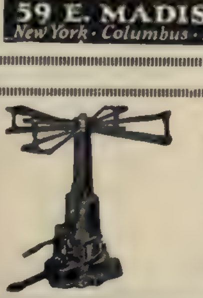

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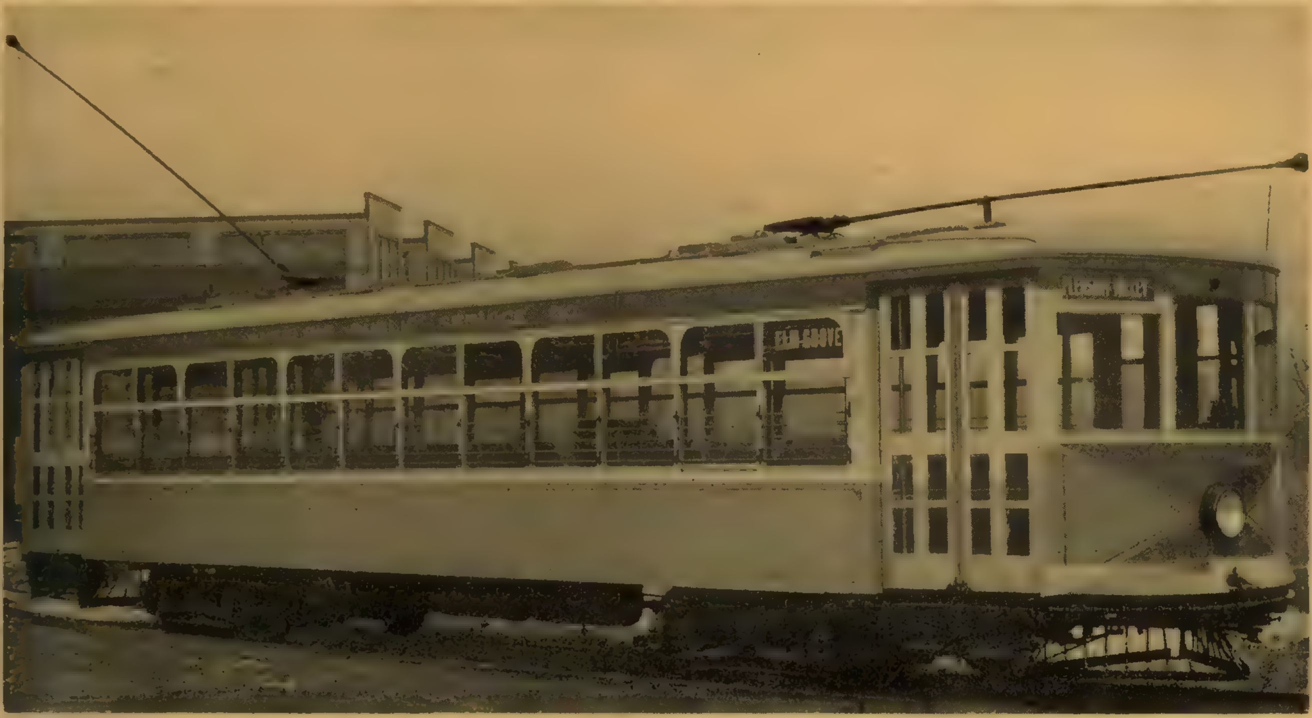

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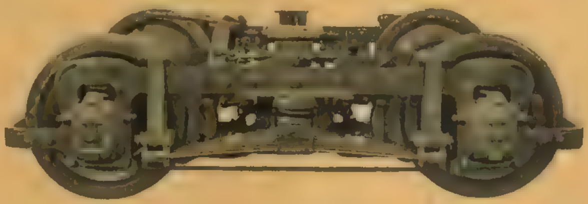

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CONTENTS

Pages
191-230

JANUARY 29, 1927

Editorials 191

Making Pittsburgh Trolley-Conscious 194

Host of ingenious publicity stunts, indorsement of newspapers and official approval by Mayor of Pittsburgh marked the introduction of "Ride the Trolley Week."

Left Rule of Road on Rochester Rapid Transit Line 198

Traffic Control Surveys to Be Made in 250 Cities ... 298

Taxing the Utility 199

BY EDWIN R. A. SELIGMAN.

Taxing systems are reviewed with particular reference to New York State. The gross-net principle is believed fundamentally sound and should be the only tax the utility should pay.

Loading Platform Meets Public Approval 202

New Equipment Saves $1,455 per Car per Year 207

BY W. C. BOLDT.

Experience of the Eastern Massachusetts Street Railway with modern rolling stock has been so satisfactory that 100 new cars will be acquired this year. Other equipment is being remodeled for de luxe service.

Seven Modern Light-Weight Cars for Gary Railways 210

Maintenance Notes 211

Asbestos Incased Baking Oven 211
Sand Drier of Large Capacity 211
Device for Rounding Copper Sleeves 212
New Equipment Available 212
Heavy-Duty Reciprocating Grinder 212
Equipment Suitable for Bus Maintenance Shown 212

Association News and Discussions 214

News of the Industry 217

Recent Bus Developments 222

Financial and Corporate 223

Personal Mention 226

Manufactures and the Markets 228

Those Who Read and Think and Plan

IN EVERY industry there is a group who think ahead; who plan for the future; who keep in touch with current developments about them so that they can foresee trends and tendencies. There are likewise the plodders—those who wait until they are literally carried along by the crowd.

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Advertising Index—Alphabetical, 48; Classified, 44, 46, 48; Searchlight Section, 43

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These gasoline parlor cars, bulky as they are, equipped with motors capable of developing speed to compete with electric road schedules, are giving traditional electric road safety through the security of Westinghouse Automotive Air Brakes.

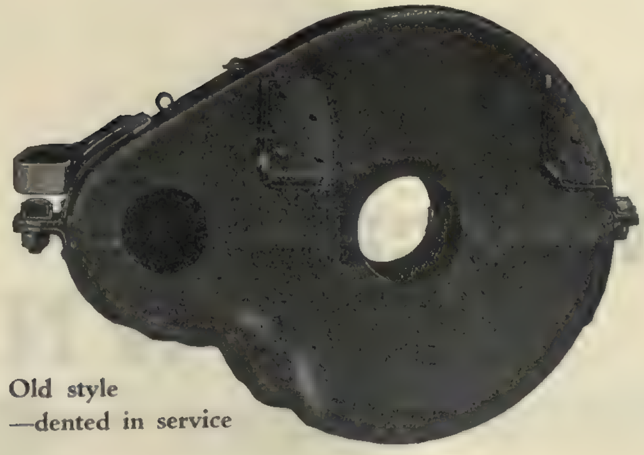
The recognized leaders among builders of highway transportation have accepted Westinghouse Air Brakes as the method of retardation in keeping with modern speed, bulk, and perplexing traffic conditions that are detrimental to security and a sane service with physically actuated brakes.

Illustrated above is the new White, a recent 6 cylinder entrant into the field of highway transportation that is meeting favor among operators, and is, like its smaller brother the four cylinder 50-B, factory equipped with Westinghouse Automotive Air Brakes.

WESTINGHOUSE TRACTION BRAKE COMPANY
Automotive Division, Wilmerding, Pa.

6163

WESTINGHOUSE
AUTOMOTIVE AIR BRAKES



Old style
—dented in service

If a Keystone Case gets dented—

just straighten it out!

If a malleable iron case hits an obstruction in the roadbed or if the lower half drops, it may derail the car or break the motor frame. But a Keystone Steel Gear Case will merely bend and buckle—and the car will ride by. Then the Keystone Gear Case can be taken to the shop and pounded back into shape. If too badly smashed it is a simple matter to replace the lower half at small expense.

The steel that goes into Keystone Gear Cases is a soft, open-hearth, deep-drawing steel. It is tough enough to protect the gear and pinion—has body enough to absorb all vibrations—and is flexible enough to bend and buckle so as to prevent serious accident as mentioned above.

The Keystone Steel Gear Case is both riveted and welded. the rivets hold the sheets together—providing the necessary tensile strength. The spot-welds unite the sheets at the welds into a homogeneous mass—preventing the sheets from slipping one upon the other. By staggering the rivets and the welds all the advantages of both methods are obtained without the disadvantages of either method.

The halves of any given type of Keystone Cases are interchangeable. This insures perfect fit before they leave our shop and also enables you to replace either half if it becomes irreparably damaged.

Ask for more complete particulars.

Essco Catalog No. 7 lists the entire line of Keystone Car Equipment. Send for your copy.

Recent types
of
Keystone Gear Cases

KEYSTONE
Steel
Gear Cases

ELECTRIC SERVICE SUPPLIES Co.

PHILADELPHIA
17th and Cambria Sts

NEW YORK
50 Church St.

CHICAGO
Illinois Merchants' Bank Bldg.

PITTSBURGH
1123 Bessemer Bldg.

BOSTON
88 Broad St.

SCRANTON
316 N. Washington Ave.

DETROIT
General Motors Building

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver

ABB

American BROWN BOVERI

Buried

steel enclosed—
no glass parts

MEMBER AERA 1927

Principal Products

- Mercury-Arc Power Rectifiers (steel enclosed)
- Electric Locomotives—for any system of current, high or low tensions
- Complete equipment for railway electrification
- Rotary Converters
- Motor Generators
- Diesel-Electric Locomotives
- Mining Locomotives
- Switches, Controllers and all Auxiliary Equipment
- Steam Turbo Generators for normal or high pressures and superheats
- Automatic Regulators
- Oil Switches
- Condensers and Auxiliaries
- Relays
- Turbo Compressors and Blowers
- Electric Furnaces
- Induction Regulators
- Ships
  - Diesel Driven
  - Turbine Driven
  - Electrical Driven
- Structural Steel Fabrication

ercury-Arc Power Rectifiers

nder a dead-end street

That is where one of our Mercury-Arc Power Rectifier substations is located. Not an everyday case to be sure, but illustrative of the ease of arranging for the installation of Mercury-Arc Power Rectifiers—no elaborate ventilation requirements—no special foundations—no noise in quiet neighborhoods. For sidewalk vaults or subway niches or other out-of-the-way spots where space or money must be saved—choose A-B-B Mercury-Arc Power Rectifiers.

They also give you—

- Higher efficiencies over whole working range.
- Elimination of the need for synchronizing.
- Operation with minimum attention.
- High momentary overload capacity.
- Reduction of maintenance costs inherent in non-rotating apparatus.

American Brown Boveri Electric Corporation
165 Broadway, New York, N. Y. Camden, New Jersey
922 Witherspoon Bldg., Philadelphia. 842 Summer St., Boston. 230 South Clark St., Chicago

AMERICAN
BROWN BOVERI

Interlocking brakes and doors by means of the M-28 Brake Valve with selective control, increases safety and convenience.

How to make cars
SAFE *and*
make them
SAVE

MORE than 14,000 cars are now active demonstrations that operating safety is increased and operating expense is decreased when operating responsibility is centralized in one man whose duties are safeguarded and simplified by complete protective and labor-saving devices which interlock car-control, door-opening, and brake-manipulation functions.

Make *your* new cars safe, and make them save with the Safety Car Control Equipment.

We make the Safety Car Control Devices which make the Safety Car.

SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.
Postal and Telegraphic Address:
WILMERDING, PA.
CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

Interlocking the power and brakes by means of special controller handle provides safeguard against operator's inattention or disability.

a book

of vital importance to ~

Electric Railway Executives

TURN THE PAGE

THERE were four Electric Railway executives and they, in common with many others in this industry, had found that the modern car pays its own way and a profit.

They then considered the fact that *new* equipment pays better and runs better on new track, and that *new* track *pays its own way and a profit,* because it is inseparable from the car.

But when they considered Steel Twin Tie Track—

"—who uses steel ties?"

MR. WHITE wanted some real facts on who uses *what* tie and *how many.*

ON PAGES 48 to 54 of the "Paved Track Notebook" he found all the latest data on this subject. He also found an analysis of the trend of larger city properties toward Twin Ties and that the largest rehabilitation program of the year involving some 30 miles of track was put on a Twin Tie renewable foundation.

"—are steel ties noisy?"

MR. BLACK wanted to know if steel ties were noisy. He had heard many conflicting reports on this.

ON PAGES 55 to 60 of the "Paved Track Notebook", Mr. Black found a complete report, by a well known consulting engineer, based on excellent data and tests indicating that type of tie used has no effect on the noise incident to car operation.

BY THIS TIME Mr. White and Mr. Black were thoroughly interested in the "Paved Track Notebook" and were getting a lot of *real, practical, usable* information out of it. The ring binder permitted them to put their *own data sheets* right in the book, and to use it as a personally compiled reference book on Paved Track Construction and design. For it *is* a *treatise* on *track.*

"-what about flexibility?"

MR. GREEN wanted to know all about flexibility, rigidity—what the difference was and why.

HE FOUND that flexibility and rigidity were comparative terms and that with the scale of rigidity which he found on Page 27, he could measure his thinking on this confusing subject and make his decisions unclouded by a smoke screen of controversy.

"-are they expensive?"

MR. BROWN was quite sure that Twin Tie Track cost entirely too much for his property.

ON PAGE 13 he found a comparison of actual costs with wood ties and steel twin ties and a distribution of labor costs on steel tie construction. And on page 14, unit costs expressed in man-hours per foot of double track which could be multiplied by his local labor rate to give him close estimates on the initial cost of Twin tie track under his own conditions.

-and so—

"– a real treatise – – –"

— these four gentlemen found out all they wanted to know about paved track construction with steel ties. They found that the Paved Track Notebook was really a reliable treatise on the subject. They found decisions, made by experts, on all the various controversies that had clouded their minds. The way was open for *clear thinking* on their 1927 paved track program.

* * *

THIS BOOK will answer for *you,* Mr. Electric Railway Executive, all the questions you have wanted answered about steel ties and answer them in a straightforward, clear and authentic manner.

* * *

THE EDITION of the "Paved Track Notebook" is limited and copies have been mailed to a selected list of electric railway executives and operating officials. Obviously, it is impossible to know the name and address of every one who may be interested. Therefore, if you will write us on your company letterhead we will be glad to send you a copy for your personal use with your name stamped in gold on the cover.

20% more bearing surface

steel Twin Tie track

THE INTERNATIONAL STEEL TIE CO.
CLEVELAND, OHIO

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

Volume 69 New York, Saturday, January 29, 1927 *Number* 5

Not Unfriendly, Merely Indifferent

WHETHER or not service is restored on the Grand Rapids, Holland & Chicago Railroad between Grand Rapids and Jenison, a distance of 8 miles, the 30,000 people along the route now know the value of reliable interurban service. Long since they had come to take the operation of the road as a fact. They were warned that their indifference and the indifference of others along the rest of the route of the road was driving the property into a position where eventually operation must be abandoned, but the supplications of the management meant little to them. The matter was not one for them to worry about; no, indeed.

The inevitable happened. Now these people are engaged in a belated effort to save at least a part of the road. Meetings have been called and there has been much weeping and wailing and gnashing of teeth. Buses have been installed in a partial effort to supply the present need, but so far they do not seem to fill the gap which withdrawal of the railway service has left.

This case is very much like that of the Dayton, Covington & Piqua Traction Company in Ohio. Lament there came too late, also. In fact, it was a pitiful picture of loss that one of the patrons of this line painted in a letter to one of the local papers. In the cases of both of these roads people set their clocks by the cars. They started work and quit work at their going and coming. They lay in bed on the stormy and sleety mornings while the freight crews of the interurbans stopped and picked up the milk in the early hours where not so many years before they had to hitch up Dobbin and drive into town. They got their morning and evening papers by interurban. If they wanted an article in an emergency they called by telephone and the interurban did the rest.

In recent years some of the needs of the patrons and former patrons of these lines have been supplied by their own private cars. But not all families have cars. Moreover, not all private cars are available at all times. These and a lot of other things the residents overlooked. They were not particularly unfriendly to the interurban. They were merely indifferent. Now that their indifference has resulted in the withdrawal of service they had come to accept as a fact, without any thought of responsibility on their part, they have grown alarmed.

It is getting to be an old story, this. In fact, these cases would not be worth dilating upon were it not for the warning which they carry to communities elsewhere of the fate that impends for some of them if they do not come quickly to realize that there are some things which are well nigh indispensable. This is meant particularly for the responsible business men, to whom the account elsewhere in this issue of the stagnation in building operations and the loss in real estate values that has followed the Grand Rapids suspension should serve as a warning. It does not mean that the territory served by these lines in the past and the residents of that territory have suffered irreparable injury. That would, perhaps, be saying too much. But it does mean that they have suffered needlessly because they had come to accept as a fact a service which was valuable to them, and had remained deaf to all efforts to enlist their interest and co-operation in meeting the impossible operating situation encountered by the railway. It is high time that business men of the country awaken to a full realization of how much their own interests are dependent on the survival and development of organized and permanent transportation service.

Newspaper Publicity Getting Demands the Right Methods

IF THE Pittsburgh Railways' "Ride the Trolley Week" did nothing else but prove that good publicity copy is news, then all the labor connected with its campaign was not in vain. That this utility secured newspaper co-operation to the extent of ten pages of front-page text, which at inside display rates would have cost $6,000, is indisputable proof that its campaign was for the good of the community.

Those who doubt this statement are invited to try their luck with that greatest of all cynics the news editor of a daily paper. That this gentleman is a cynic and not a lunatic is due to marvelous self-control, for no one from Dan to Beersheba is called upon to consume as much blah in the guise of philanthropic and altruistic gestures as he who presides over the "city desk."

If, for example, the Prince of Wales expresses a strong preference for button shoes, this gentle cynic is supposed to believe that the publicity agent of the Amalgamated Button-Hook Corporation is his star reporter. So on *ad libitum, ad infinitum.*

Taking into account this preamble, an examination of the Pittsburgh Railways' publicity approach is of value to the entire electric railway field. Apparently it was based on that fundamental factor of all amicable relations—in short, reciprocity. For example, in connection with a double issue of the company's house organ, *Transit Guest*, distributed in the cars, each newspaper was permitted to circulate a fac simile edition in which its style, feature departments and make-up were made known to thousands of citizens without the paper going to the expense of distributing sample copies. In addition to this, during "Ride the Trolley Week," as recorded elsewhere in the JOURNAL, cars were placed at the disposal of the newspapers in order that they might feature contests of interest to the community.

Small reason, then, that such reciprocal action, backed as it was by the company's record of service to Pittsburgh, should have won such unqualified support from the press. In other words, the Pittsburgh Railways had something to say that was of civic value, and in attempting to put across the message it did not fail to consider that there were others who could derive benefit from its efforts. All of which leads the JOURNAL to make the query: "Is newspaper publicity so hard to secure after all?"

El Paso Peforming Creditable Merchandising Work

EVER since awakening to the realization that electric railways are in competition with private automobiles the efforts along merchandising lines have been in the process of development. Good work has been done in recent years, but naturally many mediocre efforts have also been made. However, all such efforts are moves in the right direction, and if hammered at long enough will result in ultimate good.

Occasionally efforts at merchandising are developed that are exceptional. The story of El Paso told in the JOURNAL of Jan. 22, 1927, is one of those accomplishments that indicate a flash of genius that is refreshing. Street car service that once stood in the background as "a basic necessity" is personalized by these efforts to a high degree. The stranger, for instance, arriving in El Paso for the first time immediately is informed that "this car takes you to your hotel." He does not have to look for inconspicuous signs or ask questions—the whole side of the car is used as a billboard to tell him the answer to the first question every stranger asks when he leaves his train.

Then for the home folks as well as the stranger the advertising cards have been re-created so that the reader is made to think of Heinz soup and street car service as somehow linked together. Not only Heinz is called to mind in a new connection, but the car service is forcibly advertised at the same time.

Such skillful linking together of disassociated ideas is a mark of cleverness that, taken alone, stamps the El Paso work as a real achievement in advancing the art of merchandising service.

The Intangible Factor in the Commercial Department

IN STRESSING the need for developing commercial sense in street railway operation, R. N. Graham in the JOURNAL for Jan. 15 contributed a vital thought to the industry. Mr. Graham, writing from the standpoint of a practical operating man, goes beyond the accepted practices of selling service to focus attention upon the business that may be derived as a result of impressions as intangible as they are vital. In so doing a goal had been set up to which the present railway practices are but quarter posts on the racetrack of business.

To illustrate: It is quite possible by means of a well-organized publicity campaign, a splendid roadbed, attractive cars and well-balanced schedules to have the town talking, so to speak. But these in reality never impress the public that the operating company has plumbed the sentiment of the community or that it is not trying to mend an old garment with new cloth. In other words, all of these modern phases of transportation may be present, yet selling service to the saturation point is impossible because no study has been made of individual or conglomerate phases. Here is where we find the intangible factor.

To determine what will appeal to the greatest number of citizens and what will create it by means of balancing all the factors that enter into railway management is clearly the function of a specialized department. Unquestionably such a department in a reasonable length of time will deduce the intangible factor that finally solves the equation of 100 per cent business.

There is nothing highbrow in considering this intangible factor. Hundreds of manufacturers and merchants have already appreciated its value. The electric railway industry is a manufacturer that so far has, like other manufacturers in the old days, relied upon the product to sell itself, particularly as the product was a necessity. That day is past. With the advent of the automobile, the necessity for transportation became the necessity to sell transportation, hence inventive genius must be called upon to meet the situation. Now the industry is called upon to fight an ever-increasing tide of private transportation, the cost of which seems to be no deterrent. To win back this lost business is a task for specialists, who besides possessing technical knowledge should have vision, taste and that rare gift the ability to judge human nature.

To bring about this desired result has been the prime reason for establishing commercial departments in the various industries. As far as the commercial department in the street railway industry is concerned, it will be considered efficient and to have reached the goal set by Mr. Graham when it can get the average citizen to say he prefers to ride on a street car but cannot give the reasons for such preference.

Some Things Detroit Is Thinking About

IMPORTANT as were the questions raised by one of the Detroit aldermen calculated to fix the relative earning power of railway and bus lines of the Detroit municipal railway, they are as nothing compared with some of the other transit issues that have raised their heads in that city. As indicated in the ELECTRIC RAILWAY JOURNAL for Jan. 22, the Mayor thinks that the burden is unbearable to which the city committed itself under the terms of the contract by which it agreed to take over the lines of the Detroit United Railway. He may or may not be right, but the fact that the question has been raised just at this time is causing no little concern, particularly as it would appear that a fare increase is necessary unless the contract is modified.

In all the bickering at Detroit, just what is one to believe when certified accountants of national reputation and the system's own auditors present reports that are about $1,000,000 apart? That is quite a discrepancy, so much so that another audit has been suggested. It may seem queer to men accustomed to dealing with facts and figures that two reports covering the same period on the same property could differ so widely. Those who pretend to know say that the explanation is to be found in the accounts for "depreciation charges." It is explained that the system's own accountant has failed to charge off $1,096,000 for depreciation. This is a sum, so city officials say, a private company would charge off. A sum similar in amount is applied by the city to the purchase of the lines from the private company. In this connection the ELECTRIC RAILWAY JOURNAL finds itself largely in agreement with the Detroit *Free Press* on some of the conclusions drawn by that paper from events at Detroit, notably the expressed sentiment that the conflicting audits raise the question whether, if the Detroit municipal railway continues to travel the financial road it has been going, the city of Detroit will have any property of real value to show for its money and pains when it gets through paying the Detroit United Railway for the property it forced that concern to sell and has also met other cost obligations.

Apparently the effort at Detroit is to maintain the *status quo*. In this respect it has been charged that for the past eighteen months the physical property of the system has been allowed to deteriorate, presumably in order to make a fictitious showing of earnings. This statement will probably be resented, but the feeling is difficult to overcome that politics is seeping in at Detroit, ever so gradually, perhaps, but seeping nevertheless. It was inevitable, and the present city administration need not be too resentful of criticism to this effect.

Criticism, merely as such, defeats its own ends. Capable operators still remain with the Detroit municipal railway, but the conclusion is inescapable that it can hardly be expected they will be able to keep the property up to its former level of efficiency unless the degree of initiative in their moves is permitted to be enjoyed that existed at the inception of the municipalization of the system. It might have been possible for the city to assume a rocking-chair attitude of repose under a proper grant to a private company, but it certainly cannot do so under municipal ownership. All of which goes to prove that a municipal railway is subject to all the hazards that attach to private operation and a few—a very important few—that seldom, if ever, cause concern to the private utility handled with any degree of perspicacity. Certainly recent events at Detroit do not appear to be reassuring.

London Woman's Sudden Wealth Shows Community Value of Transportation Service

SINCE the opening of the London Underground Railway extension to Edgware a land boom has spread over that entire district. Values began to increase even before construction work commenced, and with the completion of every new half mile of track they grew by leaps and bounds. Fifteen years ago a woman had come to Edgware with the idea of spending the rest of her life in the seclusion of the country and had purchased a house on five acres of ground for $25,000. When the Underground began to look for a site for its terminal, the engineers decided that the logical spot for it was exactly opposite the center of this woman's property. One morning a real estate agent called on her and offered her $150,000 for her land. This she accepted without further ado, and the five acres now constitutes the finest business site in Edgware. Many stores have been erected where formerly there were only open fields and the section adjacent to the terminal has become an active center for local merchants.

Thus another striking illustration is afforded of the well-known fact that land is valuable only to the extent to which it is accessible. All other factors remaining the same, the coming of electric railway transportation increased the value of this property to six times what it was before. After all, there seems to be some good in the railway, despite the horrible pictures of their wickedness which the demagogues love to paint.

Grand Rapids Makes Its Report

ELSEWHERE in this issue is abstracted the annual report of the Grand Rapids Railway, whose achievements have occupied many columns of space in the JOURNAL during the past two years. In fact, some have wondered why all this attention was being paid to Grand Rapids; why this comparatively small property in a Michigan city of some 150,000 population was the cause of so much discussion in the industry.

Part of the answer is given in the annual report mentioned. The proof of the pudding is in the eating, and the final test of a railway management is its balance sheet. In the Grand Rapids report there are some mighty significant things. They are not spectacular, but they are significant, nevertheless. They do not indicate that the railway property there has suddenly become a gold mine to its owners. But the results accomplished by the serious attempt which was made on this property to see what could be done toward making a community proud of its railway seem to indicate not only that the policy adopted was sound, but that it was good business as well.

During the period from July 1, 1926, after the new cars were put in service on three lines in the city, to Nov. 30, 1926, passenger revenue on these lines increased 2.51 per cent over the corresponding period of the previous year. During the same months revenue on the remainder of the system not equipped with the new cars fell off 0.99 per cent. In weighing these figures it must be borne in mind that business conditions in the city were practically constant during the year and that the period of comparison is during the summer and early fall months when railway revenues suffer most from the use of private automobiles. Here in a city of 150,000 population is a different story on passenger revenue from that told in most cities of this size throughout the country. It must also be remembered that there are only 27 of these new rail coaches, as they are called, out of a total of approximately 100 cars operated in the city.

On the cost side of the ledger a similarly convincing story is told. Through general operating economies effected on the property during the year operating expenses were $8,465 lower during the first five months of 1926 than for the corresponding period of 1925. But after the new cars were obtained the decrease for the remaining seven months of the year in comparison with the corresponding period of 1925 was $45,170.

To measure the value of the good will created for the railway by the favorable effect of its new equipment is obviously impossible. But when the Mayor of the city is led to say in the public press that the city has such cause to be proud of its railway as to be well justified in subsidizing its operation, if that ever becomes necessary, and when a state senator from the Grand Rapids district openly advocates a change in the city charter so that the railway may be relieved from street paving, some measure of the value of the public good will being created may be obtained.

Grand Rapids has made its first annual report since its practical application of modern business psychology to railway management, and that report almost speaks for itself. It should prove of more than passing interest to railway managers in many medium-sized cities that have so far failed to find an answer for a constantly drooping curve of passenger earnings.

A Bevy of Chorus Beauties from the "Yours Truly" Company That Assisted in the Publicity Campaign of "Ride the Trolley Week"

Making Pittsburgh Trolley-Conscious

Host of Ingenious Publicity Stunts, Indorsement of Newspapers and Official Approval by Mayor of Pittsburgh Marked the Introduction of "Ride the Trolley Week"

"A WEEK for this and a week for that" has become of such recognized value to American advertising practice that the Pittsburgh Railways recently determined to employ this high-powered method in selling transportation to citizens of the Iron City.

Once the period of Jan. 10 to Jan. 16, inclusive, had been fixed as the "Ride the Trolley Week" the commercial department, under the direction of W. H. Boyce, commercial manager, began to lay out a comprehensive program that would make Greater Pittsburgh trolley-conscious.

MAYOR KLINE GIVES OFFICIAL SANCTION

Official recognition from the municipality was thought to be the first step, and this was accomplished when Mayor Charles H. Kline issued a proclamation on Jan. 3 urging all loyal Pittsburghers to support in every way the effort of the railway company to render more efficient public service. Mayor Kline recommended that citizens avail themselves of this service, stressing the common interest now existing between the city and the railway company because of the recent traction agreement. Enlarged fac similes of this proclamation—perhaps the first of its kind—were displayed on all bulletin boards in the carhouses and shops; also in all offices of the company and in those of affiliated gas and electric interests.

About 1,500 paper burgees which carried pink letters on a black background, were hung from the span-wire intersections at important streets and were used as decorations in stores and offices. This publicity was put up some time in advance of the opening day and was followed on Jan. 5 by about 1,500 paper pennants bearing the slogan of the week which was printed in white on blue and red backgrounds. Through the courtesy of Barron G. Collier, Inc., front dasher space, usually sold for mercantile and outside advertising, was placed at the disposal of the company. This dasher placard bore the slogan "Ride the Trolley Week—Jan. 10-16," and was printed in yellow letters on black background. Inside the cars there were posters illustrating a two-car train being boarded by eager patrons; each poster carried the invitation "Join the Big Parade—Ride the Trolley Week."

Another feature of the campaign was the use of 9x22-in. placards or snipes, each carrying a different message or slogan. Some of these printed eye-attracters were:

Flapper Flo Says:
"We go to the movies oftener when
sweetie has a pass."
(A reciprocal boost for the films)

Your January
Weekly Pass Coupons
Are Good Toward the Purchase
Of a Telechron Electric Clock.
Gas and Electric Shops
(A reciprocal boost for the gas-electric companies)

To Noah, said a latecomer,
"Let's go, step on the gas."
"Keep off this ark," said Noah,
"You have no weekly pass."

Tired? Nervous?
Go Home by
Trolley Tonight

Where is my wandering boy tonight?
He's gone to see some lass;
Never fear, mother dear,
He's got a weekly pass.
The Board of Directors
Has Just Declared the Regular
Unlimited-Ride Dividend on
The Weekly Pass.

In addition to these special side-window signs, *Transit Guest*, the house organ of the company, carried items of particular interest in connection with the campaign. The Jan. 3 issue was a double number presenting Pittsburgh's transit progress from the first horse car of Aug. 6, 1859, and the issue of Jan. 10 told patrons that "Ride Your Trolleys" was the order of the week. Bygone days were recalled in an interesting way by a series of placards which read: "Closed for the Day—Gone for a Trolley Ride." These cards were placed on awning hooks in the business districts of Pittsburgh on Saturday night preceding "Ride the Trolley Week," and they were considered especially appropriate in the light of the severe Sunday closing laws which are common throughout the state of Pennsylvania.

Various Epochs in Transportation as Supplied Through the Ingenuity of the Liberty Vaudeville Company

These Relics of '49 and the Gay '90s Set Pittsburghers Gaping, and at the Same Time Made Them Thankful for the Modern Street Car

The associated Equitable Gas & Duquesne Light companies not only displayed this placard and others in their stores and offices, but also followed the Pittsburgh Railways' example of using the service vehicles for the display of linen banners. In their public salesrooms, the "Gas & Electric Shops," they also featured placards which read:

> Ride the Trolley Week
>
> Buy your weekly pass Jan. 7-8-9 and secure a free coupon to apply on the purchase of an electric clock.

This was in accordance with the practice begun in June, 1926, of giving appliance discount coupons to those who buy weekly passes in advance. Under the plan, a different article is featured each month with possible discounts of $2 and $2.50 according to the pass weeks of the month, and the holder of the coupon issued during a given month has three months in which to take advantage of reductions.

MERCHANTS CO-OPERATE

Through the courtesy of the Merchants' Association, 100,000 stuffers or circulars were printed to be placed in packages sent out by the big stores. The text of the message contained paragraphs of this nature:

> When people realize the value of visiting friends, the theaters, schools, churches, etc., at will, then the value of the trolley as a means to accomplish this end of a broader and more active life becomes apparent. . . .
>
> Trolley week has been inaugurated to bring to the attention of the Pittsburgh district the values which lie in the things that can be accomplished through the use of the street cars. . . .

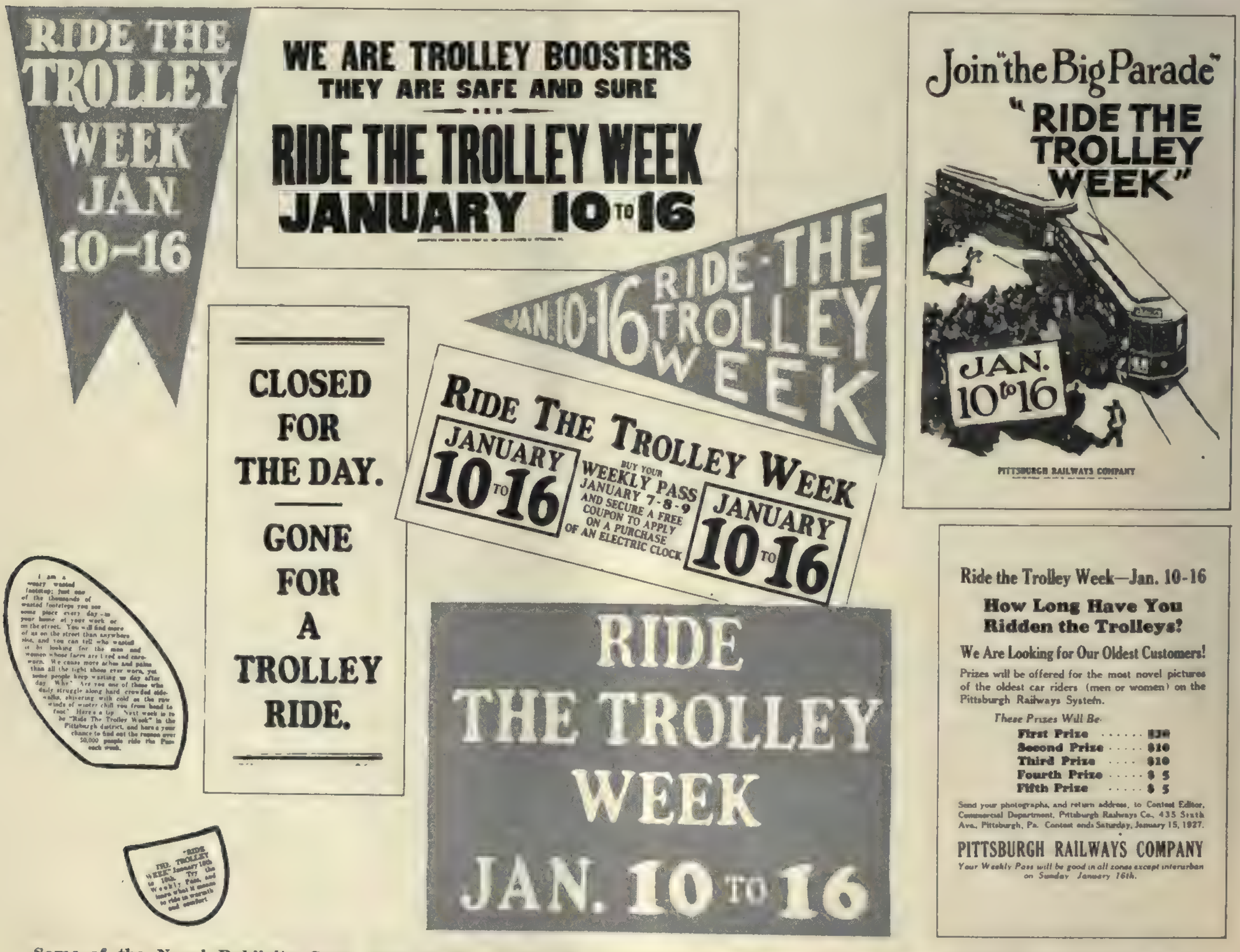
In view of the splendid cooperation from different sources, including the newspapers, the amount of display advertising purchased was remarkably small. The first advertisement, which appeared on Jan. 6, showed the outline of a footprint which recounted its sad lot and suggested the weekly pass as a way of avoiding aches, pains and cold feet. On the same day announcement was made that five prizes of $5 to $20 would be given to the oldest customers who submitted the most interesting pictures of "ye olden tyme" in transportation. Among other advertisements was a letter from Dr. Thomas S. Baker, president Carnegie Institute of Technology, which expressed the belief that the weekly pass had helped to increase night school attendance from 1,000 pupils three years ago to nearly 3,500 at the present time.

PRESS AIDS CAMPAIGN

In line with the spirit shown by the entire community, the *Gazette-Times* and the *Chronicle-Telegraph* gave splendid support to the campaign by direct editorials. The *Gazette-Times* expressed the opinion that the week would be a good time to see whether prejudice against the service of other days was justified now. On the

PITTSBURGH SUN SHOW SPECIAL
THE SUN RAY CLUB AND OTHERS CRUISING DURING
THE TROLLEY WEEK JAN 10TH TO 16TH
COME IN LET'S GET ACQUAINTED
WELCOME

The log cabin shown above was the method adopted by the Pittsburgh "Press" of assisting the campaign, while in the upper right hand picture one glimpses the "Sun's" car, in which the workings of a modern newspaper were revealed in miniature. Lower right, city and county officials being given a practical demonstration of service in the future.



RIDE THE TROLLEY WEEK JAN 10–16

WE ARE TROLLEY BOOSTERS
THEY ARE SAFE AND SURE
RIDE THE TROLLEY WEEK
JANUARY 10 TO 16

Join "the Big Parade"
"RIDE THE TROLLEY WEEK"
JAN. 10 to 16
PITTSBURGH RAILWAYS COMPANY

JAN. 10-16 RIDE THE TROLLEY WEEK

CLOSED FOR THE DAY.
GONE FOR A TROLLEY RIDE.

Ride The Trolley Week
JANUARY 10 TO 16
BUY YOUR WEEKLY PASS JANUARY 7-8-9 AND SECURE A FREE COUPON TO APPLY ON A PURCHASE OF AN ELECTRIC CLOCK
JANUARY 10 TO 16

I am a weary wasted footstep; just one of the thousands of wasted footsteps you see some place every day—in your home at your work or on the street. You will find more of us on the street than anywhere else, and you can tell who wasted us by looking for the men and women whose faces are tired and careworn. We cause more aches and pains than all the tight shoes ever worn, yet some people keep wasting us day after day. Why? Are you one of those who daily struggle along hard crowded sidewalks, shivering with cold as the raw winds of winter chill you from head to foot? Here's a tip. Next week is to be "Ride The Trolley Week" in the Pittsburgh district, and here's your chance to find out the reason over 50,000 people ride the Pass each week.

RIDE THE TROLLEY WEEK
JAN. 10 TO 16

"RIDE THE TROLLEY WEEK" January 10th to 16th. Try the Weekly Pass, and learn what it means to ride in warmth and comfort.

Ride the Trolley Week—Jan. 10-16

How Long Have You Ridden the Trolleys?

We Are Looking for Our Oldest Customers!

Prizes will be offered for the most novel pictures of the oldest car riders (men or women) on the Pittsburgh Railways System.

These Prizes Will Be

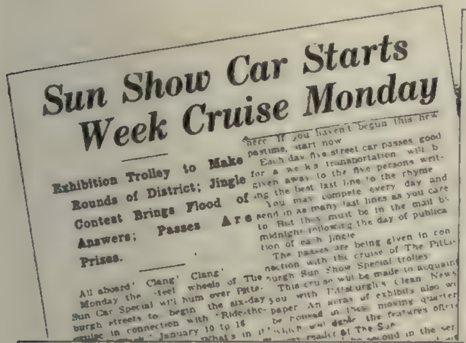
First Prize	[illegible]
Second Prize	$10
Third Prize	$10
Fourth Prize	$ 5
Fifth Prize	$ 5

Send your photographs, and return address, to Contest Editor, Commercial Department, Pittsburgh Railways Co., 435 Sixth Ave., Pittsburgh, Pa. Contest ends Saturday, January 15, 1927.

PITTSBURGH RAILWAYS COMPANY

Your Weekly Pass will be good in all zones except interurban on Sunday January 16th.

Some of the Novel Publicity Copy Used by the Railways' Commercial Department to Put Across "Ride the Trolley Week" other hand, the *Chronicle-Telegraph* pointed out that improvement in equipment had been backed by lower fares through more transfers and both weekly and one-day passes.



Sun Show Car Starts Week Cruise Monday

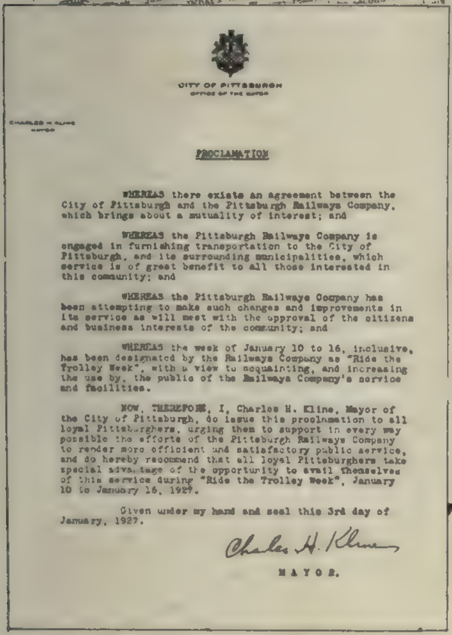
Exhibition Trolley to Make Rounds of District; Jingle Contest Brings Flood of Answers; Passes Are Prizes.

All aboard! Clang! Clang! Monday the steel wheels of The Sun Car Special will hum over Pittsburgh streets to begin the six-day cruise in connection with "Ride-the-Trolley Week," January 10 to 16.

here. If you haven't begun this new pastime, start now.

Each day five street car passes good for a week's transportation will be given away to the five persons writing the best last line to the rhyme. You may compete every day and send in as many last lines as you care to. But they must be in the mail by midnight following the day of publication of each jingle.

The passes are being given in connection with the cruise of The Pittsburgh Sun Show Special trolley. This cruise will be made to acquaint you with Pittsburgh's Clean Newspaper. An array of exhibits also will be housed in these moving quarters which will depict the features offered readers of The Sun



CITY OF PITTSBURGH
OFFICE OF THE MAYOR

CHARLES H. KLINE
MAYOR

PROCLAMATION

WHEREAS there exists an agreement between the City of Pittsburgh and the Pittsburgh Railways Company, which brings about a mutuality of interest; and

WHEREAS the Pittsburgh Railways Company is engaged in furnishing transportation to the City of Pittsburgh, and its surrounding municipalities, which service is of great benefit to all those interested in this community; and

WHEREAS the Pittsburgh Railways Company has been attempting to make such changes and improvements in its service as will meet with the approval of the citizens and business interests of the community; and

WHEREAS the week of January 10 to 16, inclusive, has been designated by the Railways Company as "Ride the Trolley Week", with a view to acquainting, and increasing the use by, the public of the Railways Company's service and facilities.

NOW, THEREFORE, I, Charles H. Kline, Mayor of the City of Pittsburgh, do issue this proclamation to all loyal Pittsburghers, urging them to support in every way possible the efforts of the Pittsburgh Railways Company to render more efficient and satisfactory public service, and do hereby recommend that all loyal Pittsburghers take special advantage of the opportunity to avail themselves of this service during "Ride the Trolley Week", January 10 to January 16, 1927.

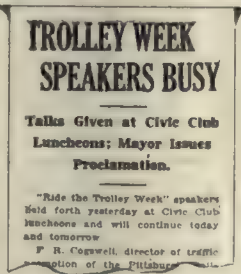
Given under my hand and seal this 3rd day of January, 1927.

Charles H. Kline

MAYOR.

Plan Washington Exhibit

This picture is one of the most famous of George Washington, our country's first president. A log cabin filled with souvenirs of Washington and his time and mounted upon a street car will be driven about the city as a feature of the "Ride a Trolley Week" to be held next week by the Pittsburgh Railways Co. The Washington exhibit will mark the opening of the annual PRESS Washington essay contest for school children

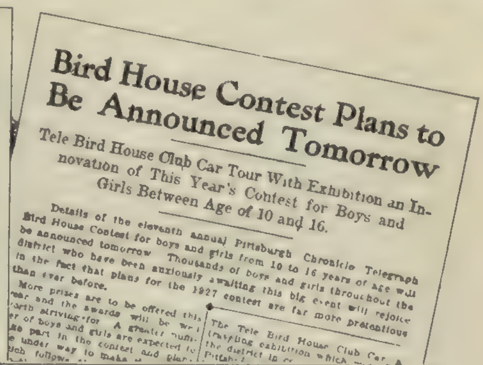


TROLLEY WEEK SPEAKERS BUSY

Talks Given at Civic Club Luncheons; Mayor Issues Proclamation.

"Ride the Trolley Week" speakers held forth yesterday at Civic Club luncheons and will continue today and tomorrow.

F. R. Cogswell, director of traffic promotion of the Pittsburgh



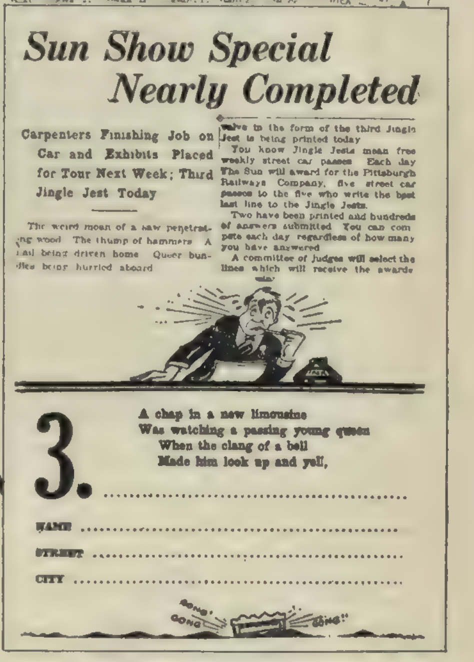
Bird House Contest Plans to Be Announced Tomorrow

Tele Bird House Club Car Tour With Exhibition an Innovation of This Year's Contest for Boys and Girls Between Age of 10 and 16.

Details of the eleventh annual Pittsburgh Chronicle Telegraph Bird House Contest for boys and girls from 10 to 16 years of age will be announced tomorrow. Thousands of boys and girls throughout the district who have been anxiously awaiting this big event will rejoice in the fact that plans for the 1927 contest are far more pretentious than ever before.

More prizes are to be offered this year and the awards will be well worth striving for. A greater number of boys and girls are expected to take part in the contest and plans are under way to make

The Tele Bird House Club Car, a traveling exhibition which will tour the district in



Sun Show Special Nearly Completed

Carpenters Finishing Job on Car and Exhibits Placed for Tour Next Week; Third Jingle Jest Today

The weird moan of a saw penetrating wood. The thump of hammers. A nail being driven home. Queer bundles being hurried aboard

twelve in the form of the third Jingle Jest is being printed today.

You know Jingle Jests mean free weekly street car passes. Each day The Sun will award for the Pittsburgh Railways Company, five street car passes to the five who write the best last line to the Jingle Jests.

Two have been printed and hundreds of answers submitted. You can compete each day regardless of how many you have answered.

A committee of judges will select the lines which will receive the awards

3. A chap in a new limousine
Was watching a passing young queen
When the clang of a bell
Made him look up and yell,
....

NAME ....

STREET ....

CITY ....

Some of the Various Printed Appeals That Concentrated the Attention of Greater Pittsburgh Upon the Vital Question of "More and Better Trolley Rides"

Mayor Kline's Proclamation, Shown on the Left, Set in Motion "Ride the Trolley Week" and the Two-Column Appeals Revealed the Interest Shown by the Press

Additional publicity was secured through the courtesy of the Kaufmann & Baer department store, operators of station WCAE. Service of the station was placed at the disposal of Thomas Fitzgerald, vice-president of the Pittsburgh Railways, who addressed the radio public on Thursday night, Jan. 6. Mr. Fitzgerald first discussed the amicable situation now existing in the city with respect to the transit problem, and then proceeded to these interesting comparisons between 1923 (Pittsburgh's biggest revenue year) and 1926:

1. Fare reduced from 6¾ cents gross to less than 5½ cents gross per ride.
2. Service increased by 1,700,000 car-miles.
3. Usefulness increased by 60,000,000 to 70,000,000 car rides.
4. One hundred miles of track completely rebuilt.
5. Nine new administration buildings erected for the transportation department.
6. Gross earnings $880,000 less.

Mr. Fitzgerald was followed by Frank R. Phillips, former general manager of the Pittsburgh Railways, and now vice-president of the Duquesne Light Company, and Fred R. Cogswell, director of traffic promotion. Several speakers assisted these gentlemen by making fifteen-minute addresses before different civic clubs during the week preceding the campaign, and to broaden the scope of the publicity 700 ministers were advised of the purpose of the drive with the respectful suggestion that a topical sermon might be deduced by comparing the transportation facilities in Biblical days with those available today. In addition hundreds of restaurants and theaters were asked to mention the campaign on their menus and programs, respectively. In the case of moving picture houses, many of them featured the "Ride the Trolley Week, Jan. 10 to 16, inclusive," slogan. They also flashed on the screen a yellow street car with the following legend:

> We have pledged ourselves to ride the street cars this week. So long—here comes the trolley now.

The theaters also were called on to supply further assistance in the person of vaudeville and musical comedy artists. Among these were Leon Errol, Ethel Bowen, and Gene Buck, producer of "Yours Truly." Miss Bowen, dressed as Sis Hopkins and traveling a-foot and a-car, attracted much attention with her antiquated satchel, which from time to time popped open to reveal the week's slogan. Leon Errol, famous for his comical falls, did ground and lofty tumbling from a trolley car, having as his motorman Gene Buck and as a background a group of chorus beauties. The Liberty Vaudeville Company, through which Miss Bowen was engaged, offered a clever variation of the evolution of travel by sending through the city a battered Frisco stagecoach, miner's pack mule, hansom cab and a two-passenger tricycle.

In spite of this, however, perhaps the outstanding features of the "Ride the Trolley Week" were the dressed up street cars. In this connection it is of interest to note that four of these cars advertised Greater Pittsburgh's leading schools. The cars were run in regular passenger service on the crosstown routes, to give the greatest publicity per mile run. They were in keen competition for public interest with those sponsored by the evening papers. The *Chronicle-Telegraph*, which has given prizes to boy builders of bird houses for the past ten years, ran a "Tele Club" car. The car, painted light yellow, contained live and stuffed birds in both cages and houses and was specially designed in connection with the paper's eleventh contest for trips to Washington. It was accompanied on its trips through the town by a lecturer, reporter and photographer.

The *Sun* car was painted lavender with the text matter done in purple and cartoons of *Sun* comics appeared around the top on the outside of the car. Inside was an exhibition showing how a newspaper receives news and how its various features are made up. As a means of reciprocity, the *Sun* featured a missing line limerick contest for which the Pittsburgh Railways was to give as prizes for the most amusing endings five weekly passes during six days. The *Sun* had expected from 200 to 300 jingles a day, but the average exceeded 1,000, which necessitated increase in the number of prizes.

A log cabin built on a flat car was the unique contribution of the *Press*. Inside was a collection of articles associated with George Washington, and an impersonator of the Father of His Country met the boys and girls to give them a button and register them for the 100-word prize essay contest which was sponsored by the paper. As an added feature, the *Press* announced that the Pittsburgh Railways had donated 30, and then increased it to 60, passes as a prize for the best letter on results from want ads.

Realizing that a campaign of this nature would not be productive of major results unless service was maintained at the highest efficiency, Mr. Cogswell, director of traffic promotion, made a careful survey of every situation where an increase in service appeared desirable to meet any likely contingencies. There were no special fare reductions offered in connection with the campaign, except that the weekly pass, usually confined to the area one fare each side from Pittsburgh center, was made good for all city car zones on Sunday, Jan. 16. This meant that the holder of a weekly pass would have the same Sunday privileges as are granted under the 40-cent-all-zone Sunday-holiday pass. This extension of the weekly pass privilege was tried for the first time on Sunday, Nov. 14, 1926. In this connection it is significant that during the campaign $58,937 was realized from the $1.50 weekly pass sale, which was an increase of $2,700 compared with the same week in 1926.

A number of President Robertson's staff members wrote letters to their personal friends. A good example of the replies follows:

> I do not know whether you are particularly interested or not, but we have been advocating in our office to our salesmen the use of the street cars rather than the automobile as an aid to efficiency. Some of our best salesmen have followed our advice and have tried out the suggestion with good results.
>
> They have found that where heretofore they have used automobiles daily, and therefore habitually, by using the street cars four days out of a week they have increased their efficiency and considerably reduced the wear and tear on their nervous system, to say nothing of the decrease in their personal overhead.
>
> I am starting this year with a discussion of efficiency methods, and I am going to bring out the value of the use of the weekly pass, not only from an economic point of view but as a time saver. I shall advocate cutting out the personal automobile entirely for business purposes, and the use of the street car where they can, and the taxi where the street car will not suit.
>
> I thought you might be interested in these plans of one of the most efficient sales organizations in the country.
>
> LEE D. HEMINGWAY,
> General Agent Connecticut Mutual Life Insurance Company.

Left Rule of Road on Rochester Rapid Transit Line

A DEPARTURE in railway methods will be introduced in Rochester, N. Y., when service is started on Rochester's rapid transit railway in the bed of the abandoned Erie Canal. Instead of operating cars on the right hand track in the direction of travel, it is planned to use the left track.

This radical change from right to left hand service is due to the installation of island platforms at the fourteen stations within the city limits, it was explained. These platforms are built between the eastbound and westbound tracks. Access to the midway platform is provided by stairways from the street level.

In order to relieve the operating company of the cost of rebuilding its equipment to meet the American or right hand travel system, the city engineers in charge of the railways decided on use of the English or left hand system. Otherwise passengers entering the subway would have no way of boarding or leaving the cars by way of the island platforms, which have no connection with the sides of the railway.

It is expected that the road will be in operation in the spring, although a movement was on foot among business men to force the opening of the line last fall. No definite plan of operation nor decision as to who shall operate the city-built railway has yet been evolved. This matter is up to a citizens' committee appointed by the late Mayor Van Zandt and headed by John P. Morse.

All the city stations are complete. Besides caring for interurban traffic, thus relieving street congestion, the new line, which bisects the city, was built for use by local steam railroads to provide better switching facilities for industries of the city.

Traffic Control Surveys to Be Made in 250 Cities

PLANS for the work of the committee of the American Engineering Council which is to co-operate with the National Conference on Street and Highway Safety were outlined at the annual meeting of the council, held in Washington, D. C., early in the present month. It will include a survey of the methods for traffic control in about 250 cities which have populations of more than 50,000, together with a few smaller sample cities to be picked out geographically. Engineers living in these cities will be expected to co-operate by collecting the necessary field data. The committee of the Engineering Council is headed by W. B. Powell.

Taxing the Utility

Taxing Systems Are Reviewed, with Particular Reference to New York State—The Gross-Net Principle Is Believed Fundamentally Sound and Should Be the Only Tax the Utility Should Pay

By Edwin R. A. Seligman
Professor of Economics Columbia University, New York, N. Y.

EDITOR'S NOTE—Prof. Edwin R. A. Seligman of Columbia University, nationally known economist and tax authority, delivered an address before the regular and advisory members of the committee on taxation of the American Electric Railway Association at the meeting of that committee in New York held on Dec. 10, 1926. This meeting was briefly reported in the JOURNAL for Dec. 18. The address by Prof. Seligman was given extemporaneously and the stenographic notes have been edited by the author.

The address was a part of the committee's study of utility taxation. It was considered of such interest that it has been abstracted in this article.

NATURALLY the methods of imposing taxes are of vital interest to you as well as to the public. Quite naturally and justifiably you look at it from the point of view of your own interests and the conservation of your own properties. On the other hand, many of you have also learned to regard it from the additional point of view of the larger economic problems involved; that is, from the point of view of social policy and general economic welfare. For the most forward-looking men among you, like the big men in every business, realize that in the long run you cannot prosper unless the community prospers and that this interdependence—this dependence of business profits upon general welfare—is inevitable.

This is the point of view from which I shall endeavor to approach the subject. I am not unmindful of the problem of earnings and profits. After all, each of us takes up his particular vocation from the point of view of making a living or earning an income, but if he is wise he also adds to it the point of view of the equities involved. Thus I want to show, if I am able to, that there is a correlation between your own welfare and that of the public.

Leading up to that, let me say a word first as to the genesis of the problem. Although it is an old story to all of you, let me recall to your minds how it has come to be a problem with us. It is a curious fact that it is not such an extensive problem anywhere else in the world, not in England, not in France. The reason why it is a problem here is because our existing tax system is a survival of an earlier system which was indeed well suited to the more undeveloped and primitive conditions of a colonial or undeveloped economic community, whereas in all the other countries of the world when the street railways or the various public utilities came into existence the economic conditions had already changed materially.

With us, as you know, the system in the eighteenth and the nineteenth centuries was that of the general property tax, a system which had existed all over Europe in the Middle Ages, but which had been outgrown in each of the European countries long before the nineteenth century. As the general property tax responded tc the instinctive feelings of justice on the part of the American taxpayer at that time, what was more natural than that when the first few corporations began toward the end of the eighteenth century, and then gradually increased during the first quarter of the nineteenth century, such as toll roads, canals and banking corporations, the community should endeavor to fit this new phenomenon into the existing situation. The fact was that every man was taxed or supposed to be taxed upon his entire property, real and personal. Unfortunately this did not work well from the very beginning, for the obvious reason that a corporation is not an individual. It is a fictitious person, but not an individual.

So far as the real estate owned by this fictitious person was concerned, there was not much difference viewed as a tax problem from the situation presented in taxing an individual. The difficulty arose when it came to the personal property, because as over against the personal property owned by individuals, consisting mainly of tangible goods—the pots and the pans of the housewife and the stock in trade of the merchant—the corporations had something else. As time went on and as corporate securities—first the stocks and much later on the bonds—developed, it was found that there were certain incorporeal rights attaching to a corporation, rights which nevertheless formed a part of their property, which could be bought and sold and which had a value. Therefore, to make a long story short, the problem that arose with us was this: What is the franchise. this peculiar thing, this liberty or privilege conferred upon artificial persons by government? How are you going to define it? How are you going to measure it? How is it to be valued and taxed?

TAXATION IN ENGLAND ON A DIFFERENT BASIS

Now this problem never arose anywhere else in the world. Why not? Because by the time corporations developed in England (let us confine ourselves to the England with which you are more familiar) the system of taxation there had become an entirely different one. As you know, there are two methods of measuring wealth, the basis of taxation. One is to figure it in terms of possession of property. But another method, and from the economic point of view the more fundamental, is that of utilizing the returns which when capitalized go to make up the property.

Our problem, moreover, was becoming increasingly difficult because the property which we had to measure and to evaluate in order to fit it into our system of taxation was becoming ever more elusive. It was intangible, and it was intangible not alone in the sense of corporate securities but it was intangible in the sense of this incorporeal privilege. After efforts more or less unavailing, however, all through the first half of the last century and down to 1875, it became increasingly difficult to tax the corporations with any semblance of equality either as among themselves or with reference to other property. Even real estate formed no exception, because in the case of the land which formed the right-of-way of the steam railroads, one stretch was valued like cow pasture and another was assessed at immense sums. The disparity was absurd because of the different criteria applied.

IN 1880 CAME THE FRANCHISE TAX

Thus it came about that in 1880 the state of New York, following the lead of Pennsylvania, which was then in the van, and despairing of reaching corporations in general for state purposes by a tax on the tangible property, introduced the tax which in the next year became known as a franchise tax. This franchise tax was, and still is, imposed upon the capital stock, although the rates vary somewhat according to the returns on that capital stock.

All sorts of difficulties soon disclosed themselves. As tax rates became high they became unequal. As a natural consequence every corporation, as every individual would have done under similar circumstances, tried to rid itself of the burden. So far as individuals are concerned, you remember that our general property tax long ago became grossly unequal. At present in this state the personal property tax, by law on intangibles and in practice on tangibles, has disappeared for state purposes and largely for local purposes.

Then a clamor arose against the public utility corporations. It was about in the '70s that the Granger movement in the West was directed against the railways. Subsequently, owing to many reasons which I need not mention here, the general feeling of suspicion of large aggregations of capital became more pronounced. Finally something had to be done about taxing the transportation companies, not only steam but now also the street railways as well as the others.

THEN THE UTILITY BECAME PUBLIC

We began to call them public utilities or businesses related to the public interest. They were now conceived by the community as standing in a class by themselves and as not susceptible to that condition of private ownership which is common in ordinary industry.

By the time the tax laws of the '90s were passed, affecting the electric railway industry, the situation had changed a little. There was an uneasy feeling on the part of the general public that there was something wrong with the American method of measuring wealth. So many inequities were involved that it often resulted in the tax being based on the private arrangement with the local assessor rather than the personal property. However, the business man now began to measure his prosperity, not in terms of capital or stock or business inventory, but in terms of profits. His prosperity depended on what he made. Here might be two business men, each having the same amount of stock, the one with a turnover ten times as great as the other, with a consequent greater degree of prosperity.

EARNINGS CONSIDERED AS A MEASURE OF WEALTH

Thus you see that the idea of earnings rather than of property began to come to the front. At first it was very crude. When the state began to apply it to corporations, it said: "Let us tax them upon their gross earnings." It is obvious why they did that. In the first place, that is about the only kind of earnings they could tax, because when they tried to get the net earnings there was no way of ascertaining them. Even among the railways there were no good methods of accounting. Every railway kept its accounts in its own way and according to no governing standard.

Thus under the conditions of that day the gross earnings tax was the only one which was practical. Here again, as time went on and as more refined methods of measurement became customary, it was realized that the gross earnings tax was a very primitive system. It was like the Biblical system applied to land—the tithe, the 10 per cent of the gross, which we still find in primitive communities in the world today, such as China.

The reason why gross earnings no longer responded to a sense of equity among the corporations themselves was that it drew no adequate distinction between the prosperous and the unprosperous companies and that it made no allowance for necessary expenses. As conditions became more complex the inequalities were intensified. Naturally, therefore, there began to arise more and more discontent. A slight attempt to meet the situation was made by the law of 1896, as a result of which the tax, although still on gross earnings, was supplemented in a minor degree by a reference to dividends.

THE SPECIAL FRANCHISE TAX APPEARED IN 1900

In New York, and in contrast to many other states, we are not allowed to deduct our debts from our real estate. In most states, if you have a farm worth $10,000 and borrow on it $5,000, you can deduct the $5,000 which you owe, but not so in New York. On the other hand, if you have debts you are allowed in the state of New York to deduct them from your personal property, a condition contrary to that which exists in most states.

In the case of one of the large railways the company found that it had been heavily burdened by unreasonable assessments on its personal property by the local assessors. Accordingly it tried to reduce the burden and devised an ingenious method by which the capital stock was reduced and replaced by a large issue of bonds. Then, of course, under the law a bonded indebtedness was deductible from the personal property, tangible as well as intangible. By issuing this great amount of bonds, the company was thus able to make its personal property a minus quantity. Moreover, it owned but little real estate, because it used the public streets, which were not liable to taxation. As a result the local tax was virtually eliminated.

Something had to be done. The company paid no taxes at all or very little taxes. In order to silence the public clamor which ensued, an ingenious senator suggested a new plan—to replace the whole existing system of taxing railways by something new. The privilege to use the streets which the state confers was called a franchise—not a general franchise, because that is the franchise to be a corporation, but a special franchise. Moreover, it was declared to be real estate, so that all the mortgage bonds would not be deductible from the assessed value.

It was about that situation that Governor Theodore Roosevelt asked me to consult with him in 1899. I told him at the time that while it was a most ingenious method and while it would surely accomplish its object, that of bringing the railways to terms, I foresaw not a little of future difficulty. I had already by that time come to the definite conviction that our method of attempting to assess wealth in terms of property was erroneous and that this new attempt would simply add another difficulty to the problem. But the political powers had determined to make capital of this situation, and, therefore, the advisers of the Governor tried to make it as good a tax, or as little bad a tax, as we could. Thus we came to have the special franchise tax.

THE TAX COMMISSION DETERMINED THE FRANCHISE VALUE

From this point on, the railways especially, and many other public utilities, began to have their worries. Why? Because the value of the franchise was relegated to the State Tax Commission and nothing was said in the law as to how it should proceed to value the franchise. Those of you who are acquainted with the situation in other states know that there are about as many different ways of valuing a franchise as there are human beings who do the valuing. Of recent years our commissions and officials have become very cautious in telling us how they value the franchise. The caution is easily explicable because as soon as they tell us how they value the franchise, you can attack it in the courts and perhaps overturn the assessment. But if they say, "We consider this the proper valuation," you can't very well claim that there is anything illegal about it.

So that is the situation as we have it today. The situation is further complicated by another unfortunate fact. As the price of securing the local franchise most of the street railway companies made all sorts of arrangements with the local bodies about paving and whatnot. In those days, horse cars were used and the horses continually got the stone pavement out of shape. That was long before the advent of good roads, the appearance of the automobiles, and the passing of the horse car. What was at one time a matter of little consequence has now, as many of you know, become a very decided burden.

In the meantime, while this antiquated and primitive system of taxation still applies to you, the efforts which some of us had been putting forth for some time bore fruit. In the case of personal, individual taxation our system has been completely changed in New York State. That is to say, we no longer rely upon the general property tax for either state or local purposes. New York is about the only state in the country which has gone almost to the limit.

In the first place, the property tax, even for local purposes, has become to all intents and purposes a real property tax. Ninety-eight per cent of the property tax or the so-called direct tax is raised from real estate.

Moreover, for state revenues, while we still have the so-called direct tax, it plays a very small rôle as compared to earlier times. We get ten, twelve or fifteen millions a year out of our total revenues of $150,000,000 to $200,000,000 a year. It has been replaced, as you know, by the income tax, the personal income tax and the corporate business tax. The personal income tax yields us this year about $40,000,000 and the corporate business tax, also levied on net income, yields about $60,000,000—together about $100,000,000.

Unfortunately, the so-called public utilities had been left out. In the rest of the world no such distinction is drawn between public utilities and other corporations. This is partly because the early public utilities behaved themselves better there than they did with us, or were made to behave better by Gladstone and others at an early period, and partly because of the peculiar economic conditions in this country, whereby the public utilities were recognized as belonging in a class by themselves. Accordingly they were omitted in this general reform.

What you gentlemen now have to face is the question as to how you should be made to fit into this general change which has been applied to all the other interests, including even the banks. The banks were the very last of the corporations to come in. They were formerly in the same position in which you are, but they were finally induced to come in under the general income tax law.

In the attempt to solve this difficulty, we said: "The simplest thing, of course, would be to do as they do in England, France, Germany and Italy, namely, to apply the general rule of the income tax and make all the companies subject to a general corporate income tax."

There were, however, two reasons which prevented us from accepting that simple solution. The one was that the problem of local taxation is a very difficult one with us in this country. How are we to raise the funds for schools and for roads? In those days we didn't get so much help from the state and the federal governments as we do now.

If the public utilities were freed from the obligations to pay taxes on real estate, it would impose a burden upon the individual owners of the rest of the real estate. Inasmuch as a given amount of money has to be raised, if you eliminate a large proportion of the taxables, obviously it must be raised by the rest. Thus you see that if the local real estate tax were abolished the public utilities would be deemed a disadvantage rather than a blessing to the localities. The local taxpayer would feel that he would have to dig his hands into his pockets because of the freedom of the public utilities from the real estate tax. That was one thing with which we had to reckon. The other was that while income or net earnings, from the abstract point of view, is decidedly the better, it is not ideal.

INCOME TAX OF EVER-INCREASING IMPORTANCE

That is the reason that, whereas the Civil War was waged with practically no income tax at all, the recent great war has been financed almost entirely upon the proceeds of the income tax. The income tax is today the sheet anchor of our whole national finance. Although income has many advantages and although we are all tending away from our property tax to the income tax, there are certain disadvantages to this method as a criterion of tax-paying ability. There is, in fact, no absolutely ideal system of measuring capacity to pay.

One of the disadvantages is that in a lean year the income is materially reduced or might even change into a deficit, whereas from the point of view of the public, the government expenditures must go on, in good or in bad years. Of course in bad years we may have smaller expenditures, but still the expenditures will not decrease in correspondence with the bad times. Since therefore you have the expenditures, you have got to have some sort of revenue. If your tax system is based entirely on income, where are you going to be?

THE GROSS-NET TAX

The consequence was we devised what we call the gross-net system. That, in a nutshell, is a system which imposes a small tax upon a corporation according to its gross earnings so there will always be a revenue, but which changes the rate according to the amount of earnings so as to diminish the objections which apply to the gross earnings tax. By imposing this gross-net tax the old system, which is no longer defensible, is eliminated and the general system of income taxation is approximated as closely as practicable under our present conditions.

For that reason, gentlemen, I should say that you ought to give this question careful consideration. I know that it will affect some of the public utility corporations differently from others. To some it will be an immense boon to get rid of the special franchise tax; to others, which perhaps have been doing a little better in their ventures and which are not yet so heavily taxed, it may involve a more or less unwelcome change. But if you gentlemen are forward-looking and wise, as I am sure you are, you will realize that in the long run you can't attempt to escape your due proportion of taxation. What we need in this country and what we are getting today, especially from our big men, is the acceptance of the principle that every man should bear his fair share according to his capacity to pay. Don't forget that in the long run, especially in a democracy like ours, no class of people and no class of corporations can hope to escape its fair share of the liability. We have had several interesting examples of this truth in our recent history. The first one was that to which I alluded when I spoke of the special franchise tax. There was another matter dating back a few years ago, when the banks contested a law which attempted to put them on an equality with other businesses and fought it in the courts. Because some of them were national banks they managed to take advantage of that clause in our federal laws which prohibits the states from doing certain things to national corporations or nationally chartered bodies. What was the result? The banks had the law declared unconstitutional and were happy. But in the very next session Senator Davenport persuaded the Legislature to impose the capital tax. This was really one of the worst taxes you can think of, a reversion to the old discarded system of property taxation. What was worse, however, the capital tax had to be so framed that it applied not only to the banks themselves, but to the private bankers as well, thus causing discomfiture to a great many other people.

You all know the great excitement that ensued. After considerable negotiation I obtained for them the assurance that as soon as the section in the revised statutes was so changed as to permit them to conform to an equitable system the capital tax would be abolished. It took them about two years to come around. Finally they consented, as they saw that the Legislature was obdurate. When the banks came around the whole thing was quickly adjusted. As a result they are now on a par with other moneyed corporations and the capital tax has been abolished.

You can't expect, in a democratic community, which is so jealous of the rights of the individual, to erect yourself into a favored class. You have got to take your portion with everybody else.

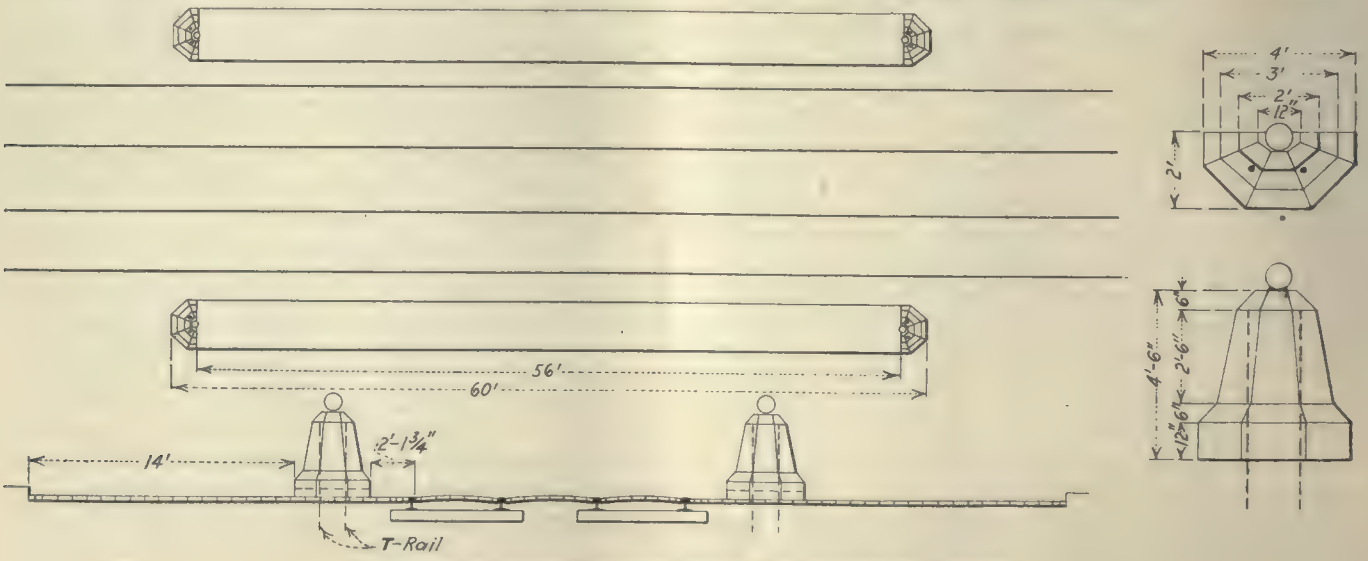
From the point of view of prudence, with reference to the situation as it is going to develop in the next five or ten or fifteen years, and from the larger point of view of what is fair and equitable and forward-looking for the community as a whole, you ought to get behind this gross-net proposition and do away with all the absurd things in our laws today, including the special franchise tax.

If you do this, and approach the subject fairly and loyally, you will be able to help solve both the state and the local tax problem and you will achieve something that will ultimately redound not only to your own benefit but to the prosperity of the community as a whole.

Loading Platform Meets Public Approval

LOADING platforms recently erected by the Wilkes-Barre Railway, Wilkes-Barre, Pa., have been heartily approved by the riding public. Four of these have been installed. Two are located at Fort Wells and Slocum Streets, Forty Fort, Pa., and two at Vaughn's Corners, Wyoming Avenue, Kingston, Pa. They are all of concrete, 4 ft. wide and 60 ft. long over abutments. The platform is raised 6 in. above the street surface. Abutments are octagonal in shape, 4 ft. 6 in. high and 4 ft. wide, reinforced by means of 80-lb. T-rail sunk about 4 ft. in the ground. Each abutment is illuminated with a single lamp incased in a round globe. This construction is rugged and presents a pleasing appearance.

Pleasing Appearance and Rugged Construction Are Combined in These Loading Platforms



Dimensions of Loading Platform Erected by Wilkes-Barre Railway

Berlin Carries Out Extensive Car Improvement Program*

FIRST ARTICLE

Complete Review of Car Development in German Capital Since Horse Cars Shows Change from Single to Double Truck Cars and Back to Four-Wheel Motor Cars and Trailers—Latest Type Equipped with Cardan Drive

By Wilhelm Pforr
General Manager Berlin Street Railway System, Inc.,
Berlin, Germany

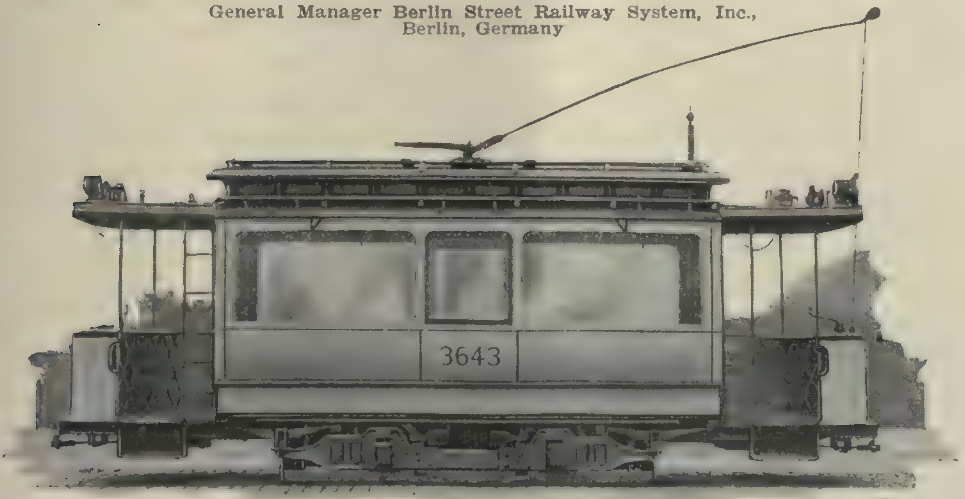


Fig. 1—Type of Motor Car First Used in Berlin. Weight, 22,000 Lb.; Length, 27 Ft. 11 In.; Wheelbase, 5 Ft. 9 In.

STREET railway cars in Berlin have undergone a continuous development since the time of horse cars. For such service, only small, light cars were used. When the lines were equipped for electrical operation, the greater part of the horse cars were used as trailers. For service as motor cars new single-truck cars were built with a wheelbase of 1.75 m. (5 ft. 9 in.) and equipped with two motors, each of 15 kw. (20 hp.). On account of the short radius curves on the line and the consequently short wheelbase necessary, the length of these first motor cars had to be kept down to 8.5 m. (27 ft. 11 in.). Braking continued to be done by hand, and the brakes on the trail cars were operated by a brakeman on the trailer. To reduce the number of employees this method of braking was abandoned in favor, first, of short circuiting electric brakes, followed by air brakes, for which electrical solenoid brakes were later substituted.

Fig. 1 shows such a motor car which was put into service at the time electrical operation was begun. It weighs 10 metric tons (22,000 lb.) and has seating and standing room for 48 passengers. It is shown equipped with a trolley pole, but at the beginning of electrical operation, for esthetic reasons, the installation of trolley wire was forbidden on certain streets, and cars strong enough to carry storage batteries had to be added to the rolling stock. Such a car is shown in Fig. 2 and its truck and wheel arrangement in Fig. 3. Its weight inclusive of batteries was 16 metric tons (35,200 lb.), and it had room for 28 seated and 35 standing passengers. When storage-battery operation proved impracticable, the batteries were taken out and the double-truck cars were equipped with trolley poles and operated over all lines of heavy loading. It developed then, however, that with only two driven axles these cars did not have sufficient traction to haul trail cars, but four motors were not put on, as at this time four-motor control had not been very well developed. Then, to improve their tractive effort, even when operated without trail cars, maximum traction trucks were installed, with total wheelbases and truck wheelbases as shown in Fig. 5.

Such a maximum traction car is shown in Fig. 4. It has room for 30 seated and 26 standing passengers and weighs 14 metric tons (30,800 lb.). About 600 cars of this type are yet in operation in Berlin. However, on account of their operating disadvantages and high operating and maintenance cost, they are being kept in service only until the time comes when they can be retired.

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*This series of two articles is based upon an article by the author entitled "Die Entwicklung des Wagenparks der Berliner Strassenbahn," in the *Zeitschrift des Vereines deutscher Ingenieure* for Nov. 13, 1926, supplemented by other information just received by ELECTRIC RAILWAY JOURNAL from Mr. Pforr.

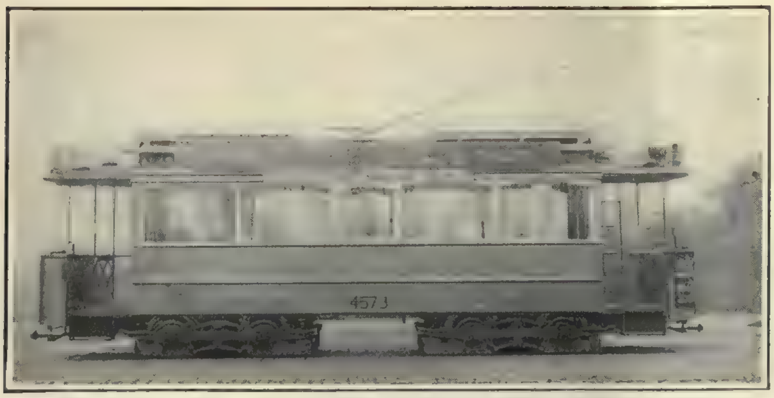


Fig. 2—Double-Truck Motor Car, Weight, 35,200 Lb., Originally Designed for Storage Batteries and Later Used with Overhead Trolley

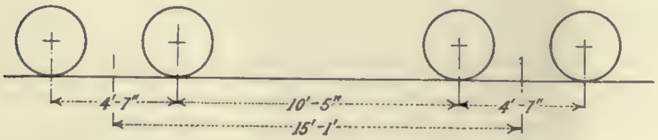


Fig. 3—Arrangement of Axles of the Motor Car Shown in Fig. 2 After Conversion for Trolley Operation

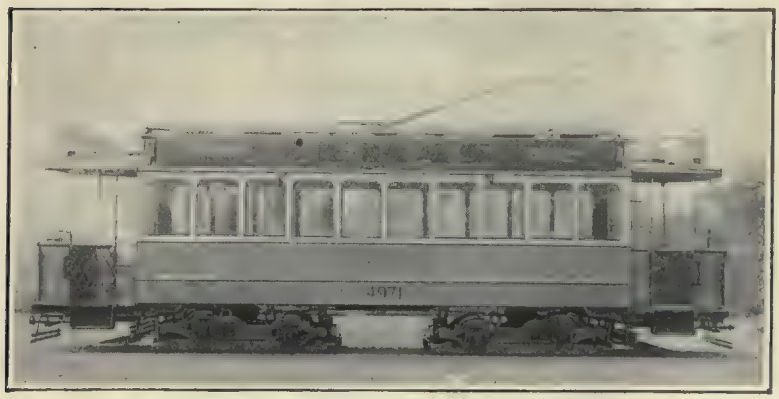


Fig. 4—Maximum-Traction Motor Car Truck of the Berlin Street Railway. Weight, 30,800 Lb. A Step in Car Development in Berlin Following the Design Shown in Fig. 2

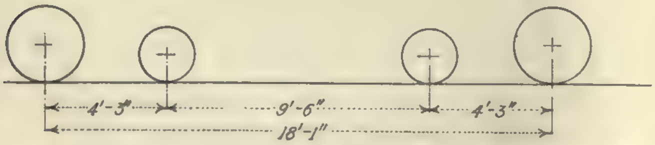


Fig. 5—Arrangement of Axles of the Motor Car Shown in Fig. 4

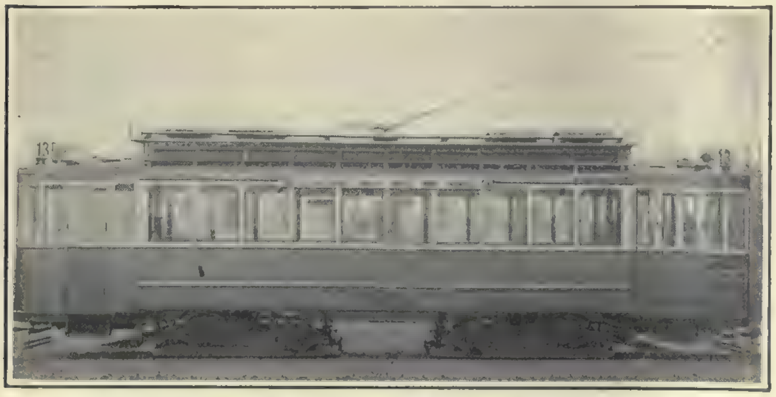


Fig. 6—Double-Truck Car with Inclosed Platforms Rebuilt from the Car Shown in Fig. 4. This Car Weighs 31,900 Lb.

On about 250 of these cars that appeared to be in the best physical condition the platforms were inclosed as shown in Fig. 6 and more powerful motors were installed. This car weighs 14½ metric tons (31,900 lb.) with 30 seated and 41 standing passengers, and its length was increased from 11 to 11.7 m. (from 36 ft. 1 in. to 38 ft. 5 in.). Cars of any greater length than this could not be run with safety in Berlin on account of the clearance at curves, and, moreover, with cars of larger capacity it is believed that two conductors would be required at many points along the line for proper collection of fares.

Of the cars shown in Fig. 1, the greater part have been scrapped, a few have been rebuilt and the remainder are used occasionally for extra service. Of those shown in Figs. 2 and 3, about 40 remain in service, but these will be retired as soon as substitutes can be provided.

During the past few years the Berlin Street Railway has been increasing the radius of its sharp curves. In all new construction a minimum radius of 15 m. (50 ft.) has been sought, and in most cases has been attained. Only in the entrance curves to carhouses in a few narrow streets have sharper curves than this been installed. With this improvement in the track, it was possible to increase the wheelbase of the two-axle cars from 1.75 m. (5 ft. 9 in.) to 3 m. (9 ft. 10 in.) and to build such cars with a length of 10 m. (32 ft. 10 in.) and a capacity of 24 seated and 43 standing passengers. Such cars are shown in Figs. 7 and 8. These were the first cars to be built with inclosed platforms, and since their construction all cars have been so equipped. The cars shown in Figs. 7 and 8 are equipped with two 39-kw. (52-hp.) motors each and weigh 13.3 metric tons (29,260 lb.). This is, of course, a large weight for a four-wheel car, but is cared for by motors of large capacity and rugged construction and by a truck with spring support between axle and truck and between truck and car body. About 200 of these cars are now in operation in Berlin.

The motors on these cars were the first in Berlin to be equipped with commutating poles, automatic ventilation and roller bearings. These three features have been continued in all of the cars used in Berlin since that time.

During the post-war inflation period it was not possible to add any more cars to the Berlin system, but some old cars, like those shown in Fig. 1, which seemed to be in good physical condition, were rebuilt to the type shown in Fig. 9. The system now possesses 250 cars of this type. It will be noticed that the truck side frames have been extended so as to reach under the inclosed platforms. This permitted an increase in length of the car from 8.5 m. (27 ft. 10 in.) to 10 m. (32 ft. 10 in.) In spite of this increase in length, the weight of the body is no greater than that in the old car shown in Fig. 1. This was made possible by the discontinuance of the use of heavy oak side sills in the body, which were no longer necessary with the extended spring base; by the substitution for the old motors of modern high-speed motors, and by the discontinuance of the use of the old wheel brakes. These had to be abandoned because the brakeshoe hangers were supported on the side frame of the truck and consequently in the new design were affected by the movements of the car body. As a result, the brakeshoes got too far away from the car wheels and interfered with the working of the hand brakes. As substitutes for the wheel brakes a drum brake was developed, this drum being mounted on the armature shaft and not being affected by the spring support of the car body. Fig. 10 shows a motor equipped with one of these brakes that is modeled after the brakes used on automobiles. This brake was described in ELECTRIC RAILWAY JOURNAL for Feb. 13, 1926.

THE NEW CARS

The reconstructed car shown in Fig. 9 was the forerunner of an entirely new design of car, of which during the past year the Berlin Street Railway has added 500 motor cars and the same number of trail cars. The new motor car is shown in Fig. 11. It has an arched roof and the framework, Fig. 12, is entirely of steel. The side sill in the reconstructed car, as shown in Fig. 9, is visible from the outside and in this car is a Z beam on which the car body rests. To these beams, which are strengthened by a strut frame, are attached the axle pedestals and the car side posts, as shown in Fig. 12. The car journals are equipped with S.K.F. roller bearings and these cars were the first to use this type of bearing in Berlin. The high-speed motors, as shown in Fig. 10, were also used with these cars for the first time. Such a motor has a capacity of 35 kw. at 800 r.p.m., and weighs 800 kg. (1,760 lb.), as compared with the earlier motors, which ran at 600 r.p.m. and required an 820 mm. (32¼ in.) diameter wheel, whereas the new motors could use a wheel of only 720 mm. (28¼ in.) diameter. This permitted so low a car floor that the usual riser between the platform and the inside of the car could be omitted.

In these cars as well as in the reconstructed cars, as already pointed out, the drum brake was substituted for the usual wheel shoe brake. As it does not operate on the wheels it is independent of the suspension of the car body, brings no side pressure on the wheels and journal boxes, and is lighter than the ordinary wheel brake. Moreover, it has the advantage that the braking material used can be an asbestos composition. The efficient operation of this brake, combined with the long life of the brake band, is such that electrical braking can be used exclusively in operation and the hand brake is required only to hold the car at a stop. On account of the small wear, it is necessary to change the wearing parts of the brake only at long intervals.

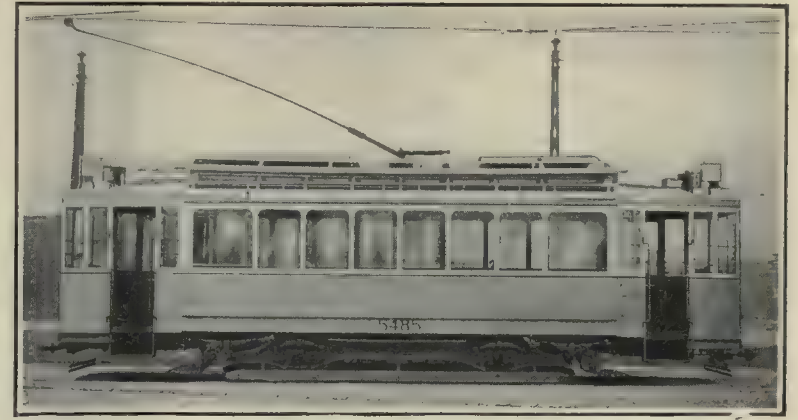


Fig. 7—This Car and That Shown in Fig. 8 Mark the Beginning of the Present Trend Toward Four-Wheel Cars with Extended Wheelbase in Berlin. The Weight of This Car Is 29,260 Lb. Its Wheelbase Is 9 Ft. 10 In.

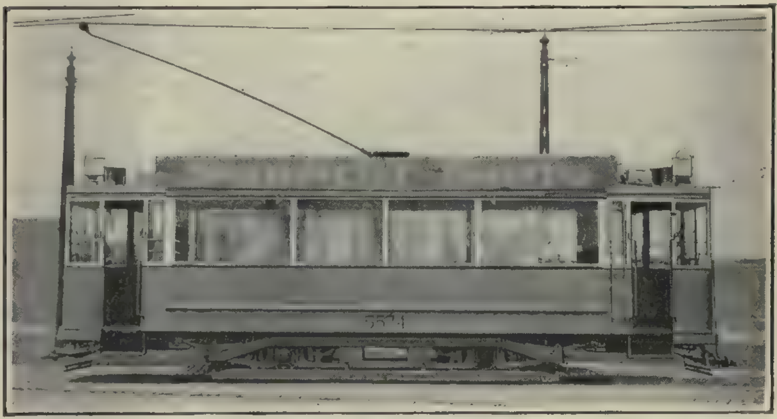


Fig. 8—A Modification of the Car Shown in Fig. 7 but with the Same Weight and Wheelbase

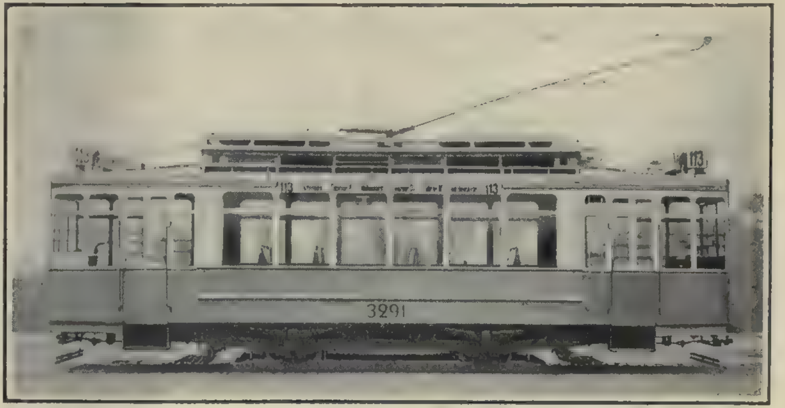


Fig. 9—Car with Long Inclosed Platform Rebuilt from That Shown in Fig. 1. The Weight Is 22,000 Lb. and the Wheelbase Is 9 Ft. 2 In.

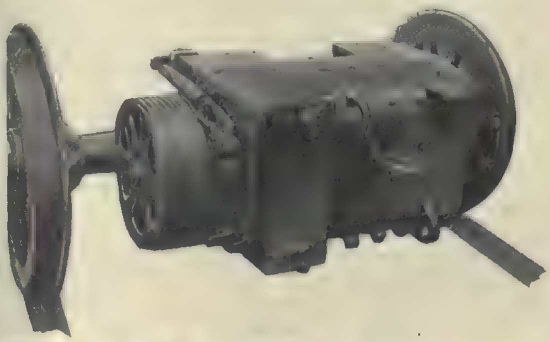


Fig. 10—35-Kw. (47-Hp.) Motor with Drum Brake on the Armature Shaft. This Motor Was Built for Use on the Motor Car Shown in Fig. 9

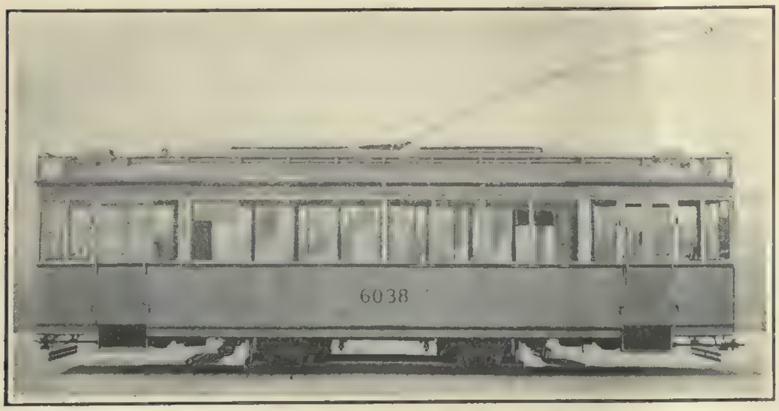


Fig. 11—The Last Type of Motor Car in Berlin in Which the Motors Are Hung on the Axles, and the Cardan Drive Is Not Used

This car is of all-steel construction with arch roof, but its principal feature of interest is the absence of a truck, the axle pedestals being attached to the body of the car. This car has a weight of 24,200 lb. and a wheelbase of 9 ft. 2 in., like that shown in Fig. 9.

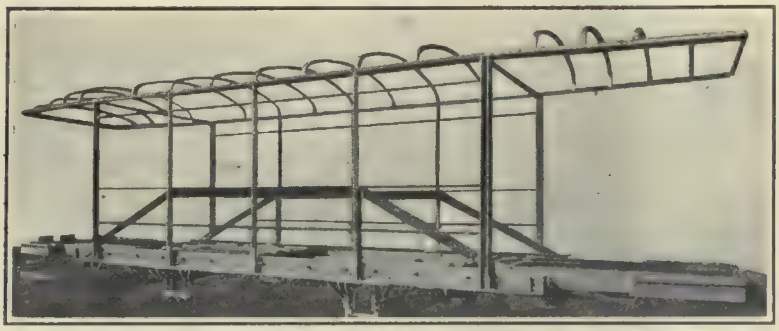


Fig. 12—Framing of the Car Shown in Fig. 11. The Side Sills Are Z Channels

On the trail cars the shoe brake has been abandoned, as on the motor cars. For the trailers the latest braking device is the so-called plier (or tongs) brake, which provides for the trailers the same kind of braking advantages as given by the brakes on the motor cars already described. An article on this brake, with chart showing method of application, appeared on page 174 of last week's issue of this paper.

The new motor cars, Fig. 11, weigh 11 metric tons (24,200 lb.) and have a capacity of 24 seated and 42 standing passengers. In the trailers there is room for four more standing passengers because of the absence of the control equipment. The low weight is due in part to the high-speed motors and in part to the absence of any truck. With the same passenger capacity, the new motor cars weigh 2 tons (4,400 lb.) less than the four-wheel cars shown in Figs. 7 and 8, and about 5 tons (11,000 lb.) less than the maximum traction truck cars, Figs. 4 and 5. To these advantages should be added that of the lower maintenance inspection required because of the new brakes and use of roller bearings.

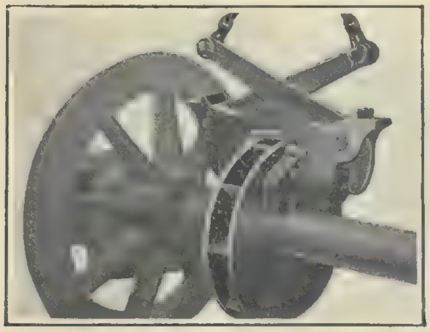
TRIALS WITH CARDAN DRIVE

In all of the cars so far described, the system of motor drive has been that in which the armature shaft is parallel with the car axle to which it is connected by spur gearing. This system of drive, which is common on most street railways, has notable objections, among them the fact that the drive is not entirely dustproof and does not operate in oil. Another disadvantage is that part of the weight of the motor is not spring supported, and this is bad for both the motors and for the track.

To overcome these disadvantages, an attempt has been made to use the system of automobile drive, known as the Cardan drive, which was first tried out by the Dortmund Street Railway under the direction of General Manager Albrecht, and about the same time was applied to some new cars on the Paris street railway system. Cars with this same type of drive have been in use also by the Berlin Street Railway, which for the last two years has had a car similar to that shown in Fig. 9 equipped with this type of drive. The method employed is that shown in Fig. 14. Ten of these Cardan drive cars are now being used with satisfaction by the Berlin Street Railway. The one which has been in regular service for two years does not show the slightest wear on the drive. The motors also, which are of the high-speed type up to this time have not given any trouble.

It should also be said that the Berlin Street Railway has been engaged in a study to see whether light-weight metal cannot be used to reduce the weight of trailers. For this purpose two trailers of the latest type built with framing made entirely out of light metal have been put in operation. It has been found that by the use of this metal a saving in weight of from 10 to 15 per cent has been secured, though the cost has been increased by about that same proportion. The ability of such metal to stand up under the conditions to which it is subjected has not yet been determined. Such ability will be made clear only by experience.

Particulars of the operation of the cars equipped with Cardan drive and the plans of the company as regards rolling stock for the immediate future will be treated in a following article.



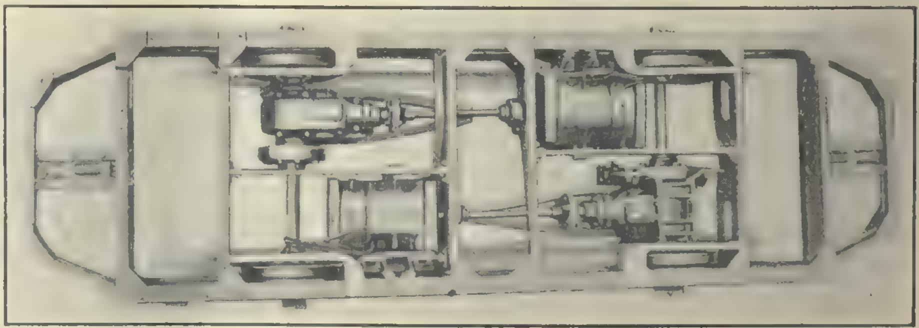


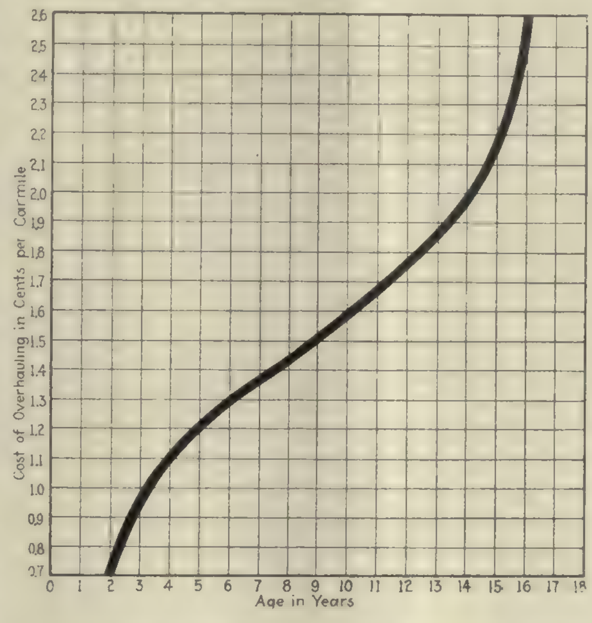
Fig. 13—(At Left) "Tongs" Type of Brake, Used on the New Trail Cars in Berlin. Fig. 14—(At Right) Floor Framing of Berlin Motor Car Equipped with Two Cardan Drive Motors

New Equipment Saves $1,528 Per Car Per Year*

By W. C. Bolt
Superintendent of Rolling Stock and Shops
Eastern Massachusetts Street Railway, Boston, Mass.

Experience of the Eastern Massachusetts Street Railway with Modern Rolling Stock Has Been so Satisfactory that 50 New Cars Will Be Bought This Year—Other Equipment Is Being Remodeled for De Luxe Service

IMPROVEMENT in cars and equipment on the Eastern Massachusetts Street Railway has stimulated travel, increased revenue and reduced operating cost. During the war the company found itself in receivership, thoroughly impoverished, with equipment of all vintages, an infinite number of types of cars, trucks and motors, most of which were worn out. In 1917 such improvements as limited funds permitted were inaugurated. Following reorganization and formation of the present company under control of a board of public trustees appointed by the Governor of the state, 250 single-truck safety cars of our own design were purchased and placed in operation. These cars were reinforced and were more substancial than the standard Birney car sold at that time. Some 450 existing double-truck cars previously operated by two men were prepared for one-man operation, through the addition of a conductor's valve which when pulled by a passenger applies emergency brakes, unlocks rear doors, and cuts off power through the line switch. By the latter part of 1921 practically all of the service on the 681 miles of track operated was being performed through one-man operation.



Overhauling Cost Increases Rapidly with Age of Cars

All of these cars have been modernized in so far as possible. All cars have been provided with highly efficient glass reflector type of headlights, automatic heat regulators, pneumatically operated doors, pneumatic sanders and illuminated destination and side route signs. Cumbersome drawbars and fenders have been removed and the fenders have been replaced by wheel guards which met with the approval of the State Department of Public Utilities. Reduction of noise has been given every possible thought, and it has been the endeavor to eliminate noise on all cars to the greatest possible extent.

The value of clean and well-painted rolling stock as a business getter was recognized. After five or six years the frequent painting of interior and exterior of cars has lifted the estimation of the company to a high level. All service cars, including snow equipment, are likewise kept in first-class paint condition, as it is not intended that a single piece of equipment should appear shabby on the streets.

Within the last several years, 75 double-truck, low-level light-weight cars were added. Believing that service, particularly on longer routes, could be made still more attractive, nineteen light-weight, double-truck cars were provided with specially designed Spanish leather seats, cushions of which are 8 in. thick, double spring construction. Backs are of the individual divided type with curved tops. Seat spacing was increased from 28½ in. to 31 in. to provide greater kneeroom. The cars were provided with linoleum floor covering, and the piping in the vestibules was completely inclosed.

Cars of this type have been placed in service on the Lawrence-Boston route, distance one way 23.2 miles; on the Lowell-Boston route, distance one way 24.2 miles, and on the Brockton-Boston line, distance one way 14 miles. The Lowell-Boston service was started in October of last year. The Lawrence-Boston and the Brockton-Boston line have just been started with de luxe service.

The first de luxe route established has shown very satisfactory results, and it is expected that the annual earnings of this route, about $250,000, will be increased at least 8 per cent judging from the results of the first four months of operation. There is no question in our minds but that this improved service will attract patronage. The management is so firmly convinced that this improvement in car service will produce pleasing results that it has authorized the remodeling of a total of 50 cars along these same lines for use on other routes which for convenience we might call "suburban routes" as distinguished from city routes or interurban routes.

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*Abstract of a paper presented at the midwinter meeting of the New York Electric Railway Association, New York City, Jan. 25.

In addition to this, the purchase of 50 additional double-truck light-weight de luxe cars has just been authorized, and deliveries are expected early this year. These cars will likewise be provided with a similar type of de luxe seats and Pullman type of rubber floor covering. They will be finished on the interior in genuine mahogany, and will be lighted with five Pullman type dome fixtures, each fixture containing a 94-watt compensated lamp.

Upon delivery of these 50 cars, the company will then have 100 de luxe trolley cars which will take care of the larger portion of the so-called suburban service. The new cars will replace 50 old-style heavy double-truck cars, and will still further improve the high standard of equipment which the management has fixed.

Purchase of these 50 de luxe cars was predicated upon a study made of economies which might result from their purchase as well as their added business getting value. Every company has car equipment of various styles and ages, and usually the older cars are less modern and are more expensive to operate. This was true in our case.

It has been our custom to keep accurate records of the cost of reconditioning every car at the expiration of the predetermined mileage interval, which will be later referred to. Individual car reconditioning costs were summarized by car group, and the results of this summary are given below. An accompanying chart shows this graphically.

SUMMARY SHOWING AVERAGE TOTAL COST AND COST PER CAR-MILE OF OVERHAULING OR RECONDITIONING ELECTRIC PASSENGER CARS CLASSIFIED BY CAR TYPE OR GROUP

Car Group	No. Cars in Group	Weight Per Car, Lb.	Age in Years	Average Cost	Miles Operated Per Overhaul	Cost Per Car-Mile, Cents
A	30	32,000	2	$749.00	100,000	0.75
B	2	33,640	2	749.00	100,000	0.75
C	25	32,000	4	1,070.00	100,000	1.07
D	101	42,880	9	1,402.00	100,000	1.40
E	100	46,280	9	1,402.00	100,000	1.40
F	74	43,200	13	1,842.00	100,000	1.85
G	43	43,900	16	1,956.00	75,000	2.60

In order to arrive at an average annual saving in maintenance per car for each new car placed in service, the expense of maintaining an old type car for a service period of 400,000 car-miles, equivalent to eight years of time, was compared with the cost of maintaining a new light-weight car—all based upon the cost figures as previously set forth and as based upon our own cost records.

COST OF CAR MAINTENANCE

Old Type Car (400,000 Car-Miles)

Initial cost of overhaul to make old car reliable		$2,600
Cost of overhaul at end of....	First 100,000 miles at 2.6 cents per car-mile..	2,600
	Second 100,000 miles at 2.6 cents per car-mile..	2,600
	Third 100,000 miles at 2.6 cents per car-mile..	2,600
	Fourth 100,000 miles at 2.6 cents per car-mile..	2,600
Total cost of overhauling (400,000 car-miles)		$13,000

New Light-Weight Car (400,000 Car-Miles)

Initial Overhaul	New Car	0
Cost of overhaul at end of	First 100,000 miles at 0.75 cent per car-mile ..	$750
	Second 100,000 miles at 1.07 cents per car-mile..	1,070
	Third 100,000 miles at 1.20 cents per car-mile..	1,200
	Fourth 100,000 miles at 1.40 cents per car-mile..	1,400
Total cost of overhauling (400,000 car-miles)		$4,420
Total saving 400,000 car-miles		$8,580
Total saving per car-mile, cents		2.145
Total saving per car per year		$1,072

The saving in energy on a basis of 50,000 miles per car per year for the light-weight double-truck car over the old type car and at the rate for energy of 1 cent per kilowatt-hour was calculated at $455.80 per year.

It was also necessary to amortize the original value of the old type car to the extent of 20 per cent of its original value ($6,000 × 20 per cent), or $1,200 over the period of eight years or $150 per year.

The combined annual saving in energy and in car maintenance was, therefore, as follows:

Annual saving in maintenance of equipment	$1,072.00
Annual saving in energy	455.80
Total annual savings	$1,527.80

Fixed charges for each new car:	
Interest at 6 per cent on $15,000	$900.00 per year per car
Depreciation on basis of twenty-year life, 5 per cent compounded annually	405.00 per year per car
Amortization of 20 per cent of original value of old car ($6,000 × 20 per cent) or $1,200 over a period of eight years	150.00 per year per car
Total	$1,455.00 per year per ca

The annual savings, therefore, in energy and in maintenance of equipment for each new car placed in service, and for each corresponding old type car retired from service, will more than pay for the fixed charges. In other words, the cost of service would actually be reduced, and no effect has been given in these calculations to other important economies resulting from this replacement, such as reduction of cost of general carhouse labor and material, including brakeshoes, lubrication, armature maintenance, etc., and the intangible savings in maintenance of track.

IMPROVEMENTS IN CAR MAINTENANCE

Coincident with the modernization of shops and car equipment as earlier set forth, the company proceeded to inaugurate modernized maintenance practices. Thirty thousand car-miles was first established as a mileage interval between general reconditioning and overhauling. This interval was later increased to 45,000; as the condition of equipment continued to improve, the interval was again increased to 60,000, later to 75,000, and 100,000 car-miles has now been established as the reconditioning period.

Every passenger car has been equipped with Economy watt-hour meters complete with car inspection dials, and these meters accumulatively register the energy consumption. The meters are used as a basis for both carhouse inspection, which is equivalent to an inspection for every 1,000 miles of car service, and for the 100,000 car-mile shop reconditioning. On the first of each month, the meter dial readings are recorded by the local carhouse foreman, and these readings forwarded to the general rolling stock office on a form provided for that purpose. One point advance on the meter dial is equivalent to 4,000 car-miles. Accordingly, when a car has reached 25 points on the meter, it has operated the equivalent of 100,000 car-miles, and therefore is due for reconditioning. When the car is reconditioned, the locked dial is again set back to zero. Considerable economies have resulted from the use of this plan, as individual car mileage statistics are entirely eliminated with the corresponding saving of some 26 clerks formerly engaged in this one operation. Cars which are in regular service become due for shop reconditioning in approximately two years. Other cars which are in infrequent service, perhaps cars of older type, do not become due for reconditioning within three or four years. This system also enables us accurately to forecast our annual budget.

The department of rolling stock and shops is continuously engaged in the scientific study of life of various car parts with consequent view of securing materials of such design and construction that will give maximum life to co-ordinate with the 100,000 car-mile overhaul basis.

Prior to 1920, it was the practice to make general repairs to cars in each of the larger carhouses. Such major repairs have been eliminated at carhouses, and have been concentrated at the shops, where work can be accomplished by specialists. Division carhouse work now consists almost entirely of inspection, cleaning, lubrication and replacement of rapidly wearing parts, such as brakeshoes, trolley wheels, controller fingers, etc.

Modern practice, together with modernization of equipment, has contributed largely to our substantial reduction in armature failures. In 1920 we were having armature failures at the rate of 475 per month, these failures occurring largely on motors of the old types. At the present time our failures aggregate 55 per month, or about 1 per cent of the total in service.

Every armature is dipped and baked and retested every 100,000 car-miles, and this procedure has had very marked effect upon armature troubles.

Similarly, a thorough examination, testing, dipping and baking of field coils every 100,000 car-miles has reduced field coil failures from some 300-odd per month in 1920 to practically 100 per cent performance.

At the period of reconditioning of car equipment, it is the practice of the company to remove all equipment parts, and thoroughly to overhaul and test each individual part. Motors which are found to have excessive wear in the axle bearing housings are welded and rebored to restore original conditions. It is considered of vital importance that armature and axle bearing housings be continuously in first-class condition, this resulting in ultimate long life of axle and armature bearings.

The company has entirely discontinued the practice of rebabbitting axle and armature bearings, and uses full brass bearings almost exclusively, with the exception of high-speed GE-264 and Westinghouse-508 motors. Every car at the overhaul period is equipped with new full brass axle and armature bearings and, barring accidents, these bearings do not require replacement until the next general overhaul period. This plan practically eliminates the necessity of installing armature or axle bearings in divisional carhouses. During the first ten months of this year 360 pairs of new axle bearings were installed in divisional carhouses, or an average of 36 pairs per month. This is equivalent to installing new bearings on only 4½ cars per month, or at the rate of one-half of 1 per cent per month of all axle bearings in service.

Within the past year and a half very careful investigation of air brakes on all passenger equipment has been made, with the purpose of bringing the brake performance on each car as near as possible to that of the light-weight double-truck car equipped with variable load brake compensators.

Maintaining car reservoirs in a safe condition is considered of sufficient importance to warrant more than the usual superficial examination for defects. Accordingly, a hydrostatic and hammer test of all tanks is included as a part of the regular car overhauling schedule.

A car repainting schedule of from 33,000 to 50,000 car-miles has been established, which operates to bring in regular cars for paint every twelve to eighteen months, while those in irregular service on this basis receive paint approximately every eighteen to 24 months. This practice of repainting cars on a mileage basis is working out very satisfactorily. The frequency with which cars are repainted has been made possible by reason of some very substantial reductions in car painting costs. Our general painting schedule has been augmented within the last year to include the use of the so-called two-color scheme.

In 1920 the cost of repainting a 44-ft. double-truck car was approximately $257, whereas today it is costing less than $100 for complete repainting of a car interior and exterior.

The following tabulation indicates the total cost of maintaining rolling stock exclusive of depreciation and retirement for the years 1918 to 1926, inclusive:

Year	Total Cost of Maintaining Rolling Stock Exclusive of Depreciation and Retirement	Cost Per Car-Mile, Cents
1918	$1,361,000	5.02
1919	1,485,000	5.69
1920	1,418,000	6.20
1921	915,000	4.65
1922	857,000	4.42
1923	797,000	4.06
1924	662,000	3.60
1925	556,000	3.04
1926 (eleven months)	533,000	3.14

The costs above indicated exclude our fixed charges, such as depreciation and retirement of equipment, and represent expenditures recorded according to the Interstate Commerce Commission classification of accounts:

29—Superintendence of Equipment
30—Maintenance of Car Bodies, Trucks and Air Brake Equipment
32—Maintenance of Brakes and Service Cars
33—Maintenance of Electrical Equipment
36—Shop Tools
37—Shop Expense
39—Miscellaneous Equipment

It should be noted that while the cost of maintaining equipment as a whole is now about 3 cents per car-mile, our cost for maintaining single-truck safety cars as distinguished from the whole is 1.6 cents per car-mile.

It may be pointed out that more than 75 per cent of the total car mileage is operated with double-truck cars, the larger portion of which are of a type weighing approximately 44,000 lb.

Car pull-ins are generally used to indicate the reliability of service. Comparison of pull-in records as between several properties is always difficult, and care must be exercised when such comparisons are made. Comparison, however, on any one property can well be considered as an indication of relative performance.

In 1920 our records indicate a pull-in for every 1,550 car-miles of service; this mileage interval was increased to 1,884 in 1921, and has been increasing each year, and for the first eleven months of 1926 the average was:

Year	Total Maintenance Pull-Ins	Average Maintenance Pull-Ins Per Month	Car-Miles Per Maintenance Pull-Ins
1920	14,436	1,203	1,550
1921	10,423	869	1,884
1922	4,972	414	4,035
1923	2,981	248	6,745
1924	1,864	155	9,994
1925	947	78	19,668
1926 (eleven months)	627	53	27,110

The pull-in record is carefully watched by each of the thirteen operating managers, comparative records being sent out each month. It is our endeavor to see that all divisions are as good as the best, and each manager is keenly interested in having his division at or near the top.

Seven Modern Light-Weight Cars for Gary Railways

New Equipment Part of Extensive Rehabilitation and Modernization Program Undertaken During Past Two Years—Light-Weight Steel Rolling Stock Is the Goal of This Utility

RECENTLY another step forward in the interest of operating economies, passenger comfort and safety was completed by the Gary Railways when it received seven new light-weight, one-man cars. This new equipment was ordered last June from the Cummings Car & Coach Company of Paris, Ill., and is soon to be placed in operation on the 10-mile interurban division between Gary and Hammond, Ind., to give a twenty-minute service.

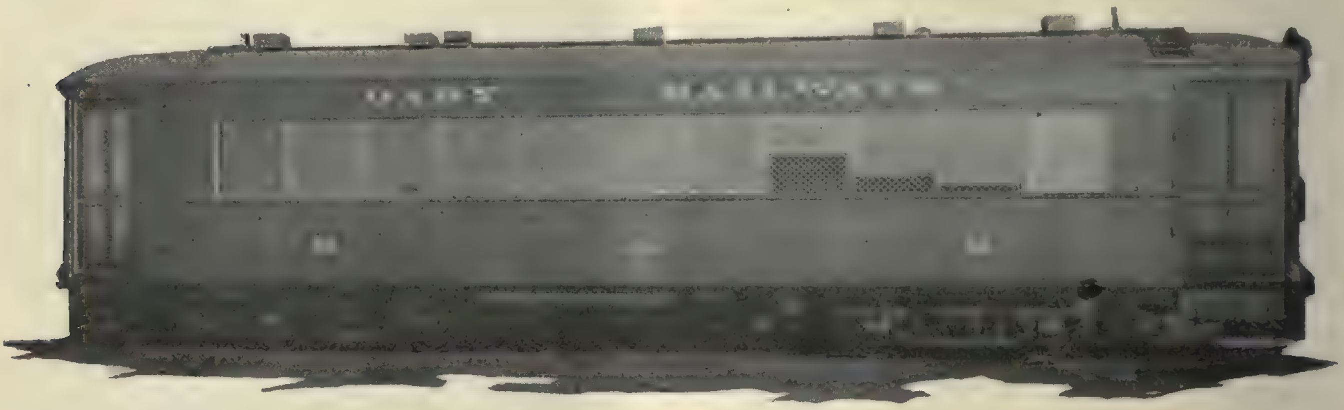
While the new cars for the Gary-Hammond line closely resemble the type put into service last July between Gary and East Chicago, they embrace many new features. Whereas cars of the old two-man type weighed more than 50,000 lb. each, the new cars tipped the beam at only 37,000 lb. Besides being lighter in weight and much more attractive in appearance, this new equipment is expected to effect a material saving in operating expense not only with respect to maintenance and repairs but also in reduced platform and power expense.

The new interurbans are propelled by four GE-247 motors of 40 hp. each and have a free running speed of about 45 m.p.h. The low-hung frame and headlinings insulated with felt help to reduce noise in operation.

The cars are equipped with wheels of small diameter in order to do away with the high step, and there is a ramp in the vestibule at either end which lowers the distance from the street to the main body floor level by several inches.

With their low, streamline body construction, attractive orange color, and wide letterboard above the windows, these cars present a striking and pleasing appearance. The interiors are finished in mahogany, the floors are covered with green battleship linoleum and the ceilings are painted an ivory color, giving a light, clean and attractive aspect. Seats accommodating 46 passengers are upholstered in green plush and equipped with deep, easy-riding springs. Directly over the aisles are mounted dome lighting fixtures of Pullman car design. The wide, clear-vision windows have been given a unique touch by making the sash of brass. This feature tends to exclude cold air. In the motorman's compartment all the unsightly control apparatus and piping have disappeared behind unobtrusive cabinets. All seven of the new cars are equipped with sliding doors and automatic treadle exits.

With the installation of the new interurban cars, the Gary Railways will have completed a substantial portion of its extensive program of rehabilitation and modernization. During the past year twelve new modern cars costing approximately $200,000 will have been purchased and placed in operation. Modern, light-weight, economically operated steel equipment is now being operated over every one of the company's four interurban lines.



New Interurban Cars for Gary Railways
These modern cars, weighing only 37,000 lb., have replaced two-man, 50,000-lb. cars on interurban line between Gary and Hammond, Ind. Each car cost $17,000.

Use of a chemical weed killer was begun by the Illinois Traction Company in 1924. The results were so successful that chemical weed extermination has now been made standard over all divisions of the Illinois system.

PRINCIPAL SPECIFICATIONS OF THE NEW GARY CARS

Type of car	Light-weight, double-end, one-man interurban
Seating capacity	46
Weight:	
Car body	17,600 lb.
Trucks	11,000 lb.
Equipment	8,400 lb.
Total	37,000 lb.
Bolster centers, length	21 ft. 0 in.
Length over all	44 ft. 8½ in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 8½ in.
Height, rail to roof	10 ft. 9½ in.
Body	All steel
Interior trim	Mahogany
Headlining	Agasote
Roof	Arch
Air brakes	General Electric
Armature bearings	Sleeve
Axles	Forged steel, 4-in.
Bumpers	Channel
Car signal system	Faraday high voltage
Car trimmings	Statuary bronze
Center and side bearings	Cummings Car & Coach
Doors	Sliding
Door-operating mechanism	National Pneumatic
Fenders	Steel pilots
Gears and pinions	General Electric
Hand brakes	Drop type
Heater equipment	Railway Utility
Headlights	Golden Glow
Journal bearings	3¾ in. x 7 in.
Journal boxes	Cummings Car & Coach
Lightning arresters	General Electric
Motors	Four GE-247, 40-hp., inside hung
Paint	Detroit Graphite Co.
Rear exit treadle	National Pneumatic
Registers	Ohmer
Sanders	Ohio Brass
Sash fixtures (brass)	O. M. Edwards
Seats	Hale & Kilburn reversible
Seating material	Green plush
Step treads	Feralun
Trolley catchers	Ohio Brass
Trolley base	General Electric
Trolley wheels	General Electric
Trucks	Cummings Car & Coach, MC-62
Ventilators	Nichols-Lintern
Wheels	Davis steel, 26 in.

Maintenance Notes

Asbestos-Incased Baking Oven

RADIATION of baking oven heat has been reduced at the Norfolk shop of the Virginia Electric & Power Company by the construction of an asbestos-incased oven designed and erected in the shop under the supervision of the master mechanic, T. W. Madison.

Neat and Substantial Appearance of Asbestos-Covered Baking Oven Used in the Norfolk, Va., Shop

This oven is 5 ft. 3 in. wide, 5 ft. 6 in. deep and 6 ft. 9 in. high. It is of all-metal construction. The corner, roof and door framing are made of 3-in. x 3-in. steel angles, riveted together. The floor framing consists of 3-in. tees. All cross framing and bracing is made of 1¼ angles. This angle framing is covered entirely with No. 16 sheet steel. A layer of asbestos wool 1 in. thick is placed outside of this metal on all six sides of the oven and is held by an outer covering of 1/16-in. sheet steel. The seams of these plates are covered with ⅛-in. x 1-in. metallic strips fastened by means of machine screws. A substantial door, 3 ft. wide, provides for easy entrance and exit of the armatures and field coils.

Pipe racks for the support of the field coils undergoing the baking process are installed 4 ft. above the floor inside of the oven near the back. Two banks of Consolidated Car Heating Company's double-coil car heaters, four units on each side of the oven, provide the necessary heat. They are controlled from a metal cabinet located outside the oven, which has four switches and four fuses to permit of four-step heat adjustment. The first step gives a maximum oven temperature of 100 deg. F., the second 150 deg. F., the third 225 deg. F. and the fourth 275 deg. F.

This oven has a capacity of approximately 25 field coils and three railway motor armatures. All armatures are placed in the oven and removed from it by means of a Frankline crane. The oven was made high enough to allow clearance for the entrance of the crane boom.

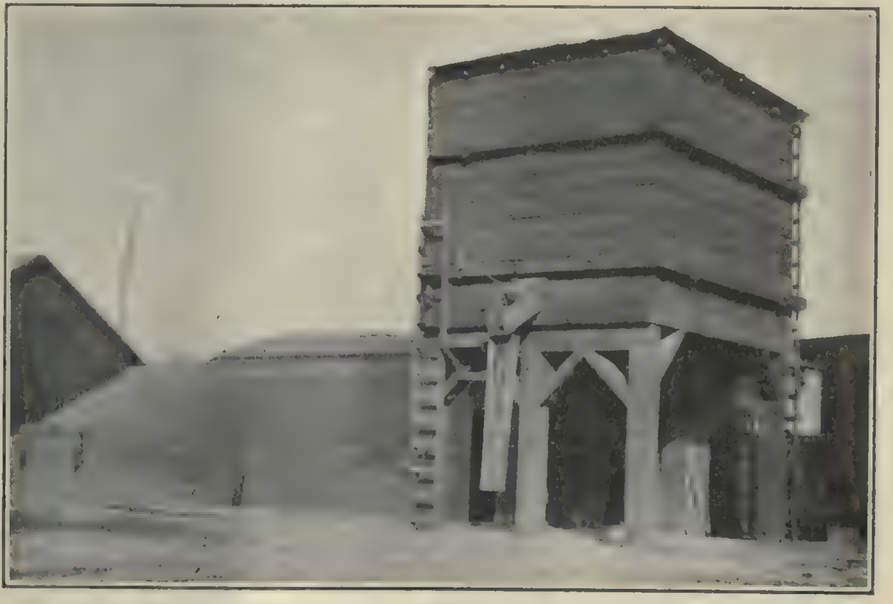
This oven has supplied a quick and effective method for the handling and the baking of armatures and field coils.

Sand Drier of Large Capacity

SAND used by the various departments of the Los Angeles Railway is dried in a rotary kiln at the materials yard of the way and structures department. This plant has a capacity of about 100 tons of sand a day. It is entirely machine operated, the only attention required being the breaking down of the supply of piled up wet sand.

In the drier wet sand is passed through an internally heated drum, placed at an angle of 10 deg. so that the sand flows through by gravity. The wet sand is taken from the pile outside by a bucket conveyor and carried to the head of the rotary, which is about 8 ft. above the floor of the plant. There are two concentric drums, the outer approximately 4 ft. in diameter and 10 ft. long. In this drum is another of equal length, 2 ft. in diameter. This is supported by spokes between it and the outer one. Both are rotated by an electric motor drive in a manner similar to that used on drum concrete mixers. At the lower end of the inner drum are gas jets for directing an intense flame up through the cylinders, while the upper end is connected with a flue leading outside.

Sand from the hopper supplied by the bucket chain conveyor is fed into the upper end of the outer drum. It flows by gravity to the lower end,



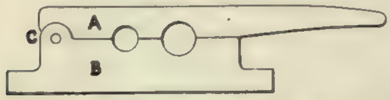
Sand Drying Plant of Los Angeles Railway Has Capacity of 100 Tons Per Day

Its operation is continuous and automatic, the wet sand being fed by bucket conveyor to an inclined drum kiln, out of which it falls into buckets of another chain conveyor, which carry it to the loading bin.

out of which it falls into buckets of another chain conveyor. These empty the now dry sand into a large hopper bin located over two side tracks. Openings in the bottom of this bin permit the controlled loading of two supply cars at a time. The whole outfit is contained in a frame building.

Device for Rounding Copper Sleeves

IT IS quite general practice among electric railways to use a sleeve over stranded conductors where they fit into terminals. For this use both the inside and outside dimensions of the sleeve must be maintained within desirable limits. Where seamless brass tubing is used both inside and outside diameters can be specified, so that the inside will fit the conductor accurately and the outside will fit the coil terminals or brush-holder lugs.



Device for Shaping Soft Copper Sleeves for Installation on Leads

Seamless brass tubing is quite expensive and some railways have had serious delays in getting delivery. Soft rolled copper is usually available as scrap from other electrical repair operations and has been used to advantage for these sleeves. This material, being soft, yields easily and so some method of rounding the sleeves after they are installed is necessary, as they will become distorted.

The accompanying illustration shows a device for rounding such copper sleeves which is in use in the department of electrical repairs of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y. The upper member, marked *A*, has an extension to be used as a handle. This is hinged to the lower member at *B*, the lower member being screwed to a bench so as to hold it firmly in position. The two members *A* and *B* are fitted with several half poles of different diameters as are required, the two sections being arranged so as to register accurately. With a sleeve installed on the end of a lead it is placed in one of the holes corresponding to its outside diameter and the upper member of the device is brought down sharply, so as to produce a hammerlike blow. This equalizes the diameter of the sleeve and insures an accurate fit in the round hole of the terminal or lug to which it is to be applied.

"Save the surface and you save all." Another reason why you should dip and bake your armatures.

New Equipment Available

Heavy-Duty Reciprocating Grinder

FOR use by the larger electric railway companies which are troubled seriously with large quantities of corrugated rail, the Railway Track-work Company, Philadelphia, Pa., has just placed on the market a heavy-duty reciprocating rail grinder. Present practice of electric railway companies is to grind out corrugations as quickly as possible so as to insure that the amount of corrugated rails does not become excessive. The new track grinder will do a far greater amount of work than smaller grinders, so that the cost is reduced.

New Type of Heavy-Duty Reciprocating Grinder

The new machine is arranged with six grinding bricks on each rail. The reciprocating movement for the grinding is furnished through a rocker arm so as to give an 8-in. stroke. A 50-hp. motor is used for the driving and 150 strokes per minute are produced at the grinding surface.

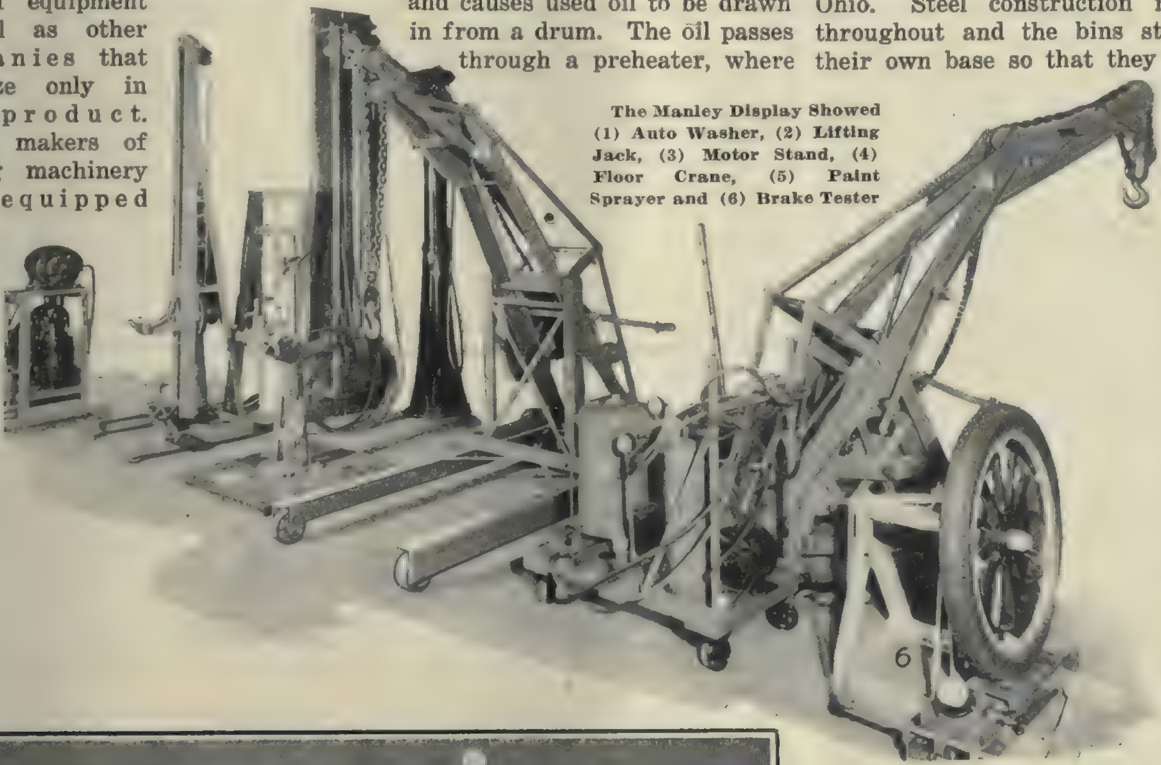
In order to provide a convenient water supply for the grinding the new machine has two storage tanks, which provide a total of 1,000 gal. The grinder has also been arranged so that it will operate as a self-propelled unit, and for this purpose a standard 25-hp. motor has been provided. The complete outfit weighs about 20,000 lb. and for ordinary work a crew of three men is sufficient.

Equipment Suitable for Bus Maintenance Shown

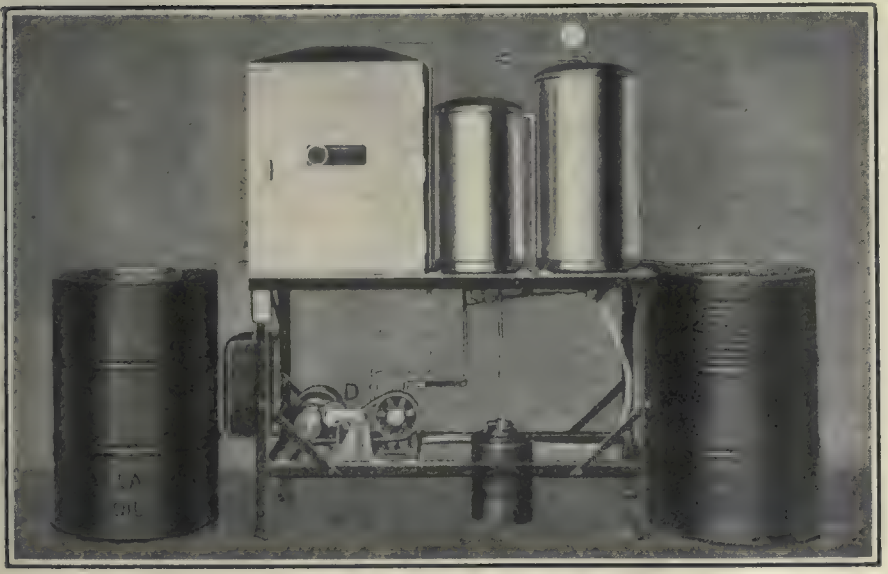
SHOP tools and fixtures for servicing of heavy automotive equipment was shown at the annual Automobile Show held in New York Jan. 8 to 15. The equipment was of particular interest to electric railway men who are operating buses because of the attention paid to maintenance problems. Servicing equipment shown covered a wide variety of types and uses. Jobs which are ordinarily done by hand on a bus chassis were demonstrated to show the use of maintenance tools in the various working exhibits. In most cases new equipment resulted in a considerable saving in time and labor and gave more uniform results than hand methods. Designers of apparatus were awake to the fact that maintenance service requires sturdy construction in order to give long life.

The provision this year for a shop equipment section at each of the various automobile shows throughout the country is sure to prove of educational value to electric railway personnel, since there will be an opportunity to see the various pieces of apparatus used for maintaining automotive equipment in actual operation. Because of its general utility value to a bus repair shop, compressed air was a prominent factor at the show in New York. Equipment shown demonstrated the saving in time and labor that results from the use of air for paint spraying, cleaning operations and forcing methods.

Car washing machinery was one of the leaders of the show. Air compressor companies exhibited this class of equipment as well as other companies that specialize only in this product. Several makers of washing machinery have equipped their products so that compressed air is made available for other operations, such as tire inflation, air cleaning and spraying. A new fluid dynamometer exhibited for testing engines provides a quick and easy means for measuring the horsepower.



The Manley Display Showed (1) Auto Washer, (2) Lifting Jack, (3) Motor Stand, (4) Floor Crane, (5) Paint Sprayer and (6) Brake Tester



New Oil Reclaiming Equipment

> *"99-44/100 per cent pure" should apply to your wool waste for motor bearings.*

Another piece of equipment of particular interest to electric railway maintenance men was the oil reclaimer exhibited by the Skinner Automotive Device Company, Inc., Detroit, Mich. With this system a pump maintains a constant vacuum and causes used oil to be drawn in from a drum. The oil passes through a preheater, where it is warmed, and then enters a rectifier tank, where it is heated and aerated until the liquid impurities are distilled out. The impurities pass as a vapor into the preheater, where they finally are condensed and collected.

The refined oil in the tank is conducted to the preheater, where it flows into a chamber. Heavy solid particles settle out and are deposited in a drum. The oil is then delivered to the top of a filter chamber and passes over a series of filters to remove the remaining dirt. The oil as finally purified drains by gravity into a drum.

A revolving bin for economical storage was displayed by the Wellston Manufacturing Company, Wellston, Ohio. Steel construction is used throughout and the bins stand on their own base so that they can be located as desired. Each section revolves independently of the other and can be rotated in either direction. A patented stabilizing feature prevents sagging and getting out of line due to heavy load.

A very complete display of equipment suitable for bus maintenance was shown by the Manley Manufacturing Company, York, Pa. The display included portable floor cranes, motor stands, auto washers, tire changers, forcing presses, lifting jacks, paint-spraying equipment and a brake tester.

The brake-testing equipment shown, while simple in construction, is sturdy enough for most bus garages. This tester reverses conditions from the standard method by providing a moving platform on which the wheel of the bus is mounted in order to register the pressure required to cause the brake drum to turn in the band. A lever is used to build up pressure for equalization adjustment purposes.

Association News & Discussions

New York Electric Railway Men Meet

Annual Midwinter Session Well Attended—Papers Covered Wide Range of Operations, Specializing on Accident Prevention and Maintenance—L. S. Storrs Reviewed European Trip

ON JAN. 25 the members and delegates of the New York Electric Railway Association gathered at the Commodore Hotel in New York for the annual midwinter meeting. The morning and afternoon sessions were crowded with talks and discussions by New York operators as well as invited speakers from neighboring states.

The annual dinner was held in the evening, at which the Hon. A. Harry Moore, Governor of New Jersey, gave an address, followed by the "constructive humorist" Dr. W. Warren Giles.

At the morning session Lucius S. Storrs spoke extemporaneously and gave many interesting comments on his recent trip through Europe.

"Unbounded enthusiasm," said Mr. Storrs, "never existed in Europe in making extensions into undeveloped territories and in providing service to small communities as it has in America." Had it not been for such extension and overdevelopment in the early days of American electric railway development the industry today, in all probability, would not be in the condition that it is. It is general all through Europe that there is five times the population per mile of track that there is in the United States. Even with the further advantage of not having the number of private automobiles with which to contend and compete, European operators find their situation in many respects as acute as it is in America today.

Many of the same problems that are being solved in the United States today are being solved in Europe in a somewhat similar manner. The service in the big cities is being unified, or coordinated, and where competitive services have been unified it has generally been found that the patronage of the combined service was greater than that of the sum of the competitive systems. This unification work is being accomplished in London and Berlin particularly.

Mr. Storrs made the statement that European street cars are noticeably quieter than those in the states. This is due jointly to better maintenance of both track and rolling stock with the objective of noise reduction, as well as in the design of the cars.

"Along the lines of new design there have been many interesting developments in London, Berlin and Nuremberg," said Mr. Storrs, "and many of these designs have recently been brought to your attention through the good agency of the JOURNAL." There is somewhat of a general tendency to get away from double-truck cars and to build long car bodies mounted on four wheels. New designers in London are for the first time beginning to use air brakes, but generally on the Continent electric braking is the rule.

New Paris cars are very free from cumbersome equipment mounted underneath the bodies. Two small high-speed motors below the floor are connected to the driving axles through a system of bevel gears which are completely submerged and running in oil.

Mr. Storrs read a brief comment from the manager of a large European system wherein the manager spoke of his visits to the United States and the reports of many other European visitors, saying in effect that "the time will come when Europe will be modern and the United States will become old fashioned. The world used to look to the United States for progress and new developments, but not so today." While Mr. Storrs disclaimed a belief in this, it was natural that it was food for much thought and an observation that cannot be overlooked by American transportation men.

H. K. Bennett, safety manager United Electric Railways, Providence, R. I., delivered an inspiring talk on the value of safety work by utility companies as well as by all organizations. The monetary value of life and limb is of no consequence compared to the real value to the individual and his associates.

COMING MEETINGS
OF
Electric Railway and Allied Associations

Feb. 2—Central Electric Railway Master Mechanics' Association, Toledo, Ohio.

Feb. 3—New England Street Railway Club, meeting, Copley Plaza Hotel, Boston, Mass.

Feb. 3-4—Central Electric Railway Association, winter meeting, Toledo, O., Commodore Perry Hotel.

Feb. 4—American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p.m.

Feb. 7-10—American Institute of Electrical Engineers, annual convention, Engineering Societies Building, New York City.

Feb. 18-19—Kentucky Association of Public Utilities, annual convention, Brown Hotel, Louisville, Ky.

April 26-29—Southwestern Public Service Association, convention, New Orleans, La.

Oct. 3-7—American Electric Railway Association, annual convention, Public Auditorium, Cleveland, Ohio.

On Nov. 15 last year, through the agency of the radio, Mr. Bennett established an "Uncle Red's A.B.C. Club" for the promotion of safety, the A.B.C. being the initials of the club's watchword, "Always Be Careful." Announcement was made that the first eight whose names were received would be the officers of the club. The morning after the announcement 500 letters awaited opening. By Jan. 1 there were 900 names of children from 9 to 15 years of age enrolled, and on Jan. 24, due to a membership drive for which some 27 prizes amounting to $500 were distributed, the enrollment became 16,950 children. As Mr. Bennett said: "There are nearly 17,000 children who have promised not to roller skate in the streets, not to use their scooters on the highways and to follow other similar rules of highway safety."

A. L. Hodges, assistant to the vice-president and general manager Brooklyn City Railroad, discussed the safety bonus plan. Mr. Hodges explained that this plan consisted of allowing each motorman and conductor $5 for each 30 days that he worked on full time with no "at fault" accidents to his credit. Even a faultless accident that was unreported caused the trainman to lose the bonus for that month. Both the motorman and conductor are held jointly responsible for "at fault" accidents and likewise receive separate bonuses. The result for the first few months of this system are told in Mr. Hodges' analysis, which appears on page 215.

Dr. C. P. Segard, assistant secretary of the Third Avenue Railway, New York City, took an opposing view of the bonus plan, as explained in his paper abstracted on page 216.

In discussing the safety problem, A. D. Brown, claim agent for the New York State Railways, Syracuse, N. Y., said that the particular system employed, whether with or without a bonus system, was not of so much importance as the interest and energy that was displayed by the employees in promoting safety.

R. R. Hadsell, general superintendent of transportation New York State Railways, Rochester Lines, stated that the award system was in effect on that property. This plan has worked well and has created considerable interest in the subject of safety. Awards should not be monetary and the interest of trainmen can be aroused by talks from the executives in which the cost of accidents are thoroughly analyzed.

Samuel Porcher, assistant to the vice-president Pennsylvania Railroad, developed at some length the purchasing and stores system as now used by that company. Some 14,000 articles in amounts totaling about $50,000,000 represent the normal stock carried by the railroad. The purchases to maintain this inventory are about $150,000,000 a year, or three times the normal value of stock on hand.

There is no centralized storeroom, but there is a centralized store control. The stores accounting system is based on actual inventories, which are kept up to date monthly. On the entire system there are 21 ordering and distributing storekeepers, with supplies under their jurisdiction kept in 400 to 500 locations. The entire department is under a stores manager and is divided into two main parts, under two general storekeepers, one of whom, located in Philadelphia, has charge of the requisitioning of material that must be purchased from outside sources, while the second, located at Altoona, has supervision over that element of the stores manufactured in the company's shops.

It is interesting to note the source of the maintenance and operating materials that are handled by the stores department. Sixty-six per cent comes from manufacturers direct, 12 per cent in value are materials that are essentially manufactured in the company's shops and 22 per cent are recovered or reclaimed from old or obsolete equipment which otherwise might be largely scrapped or wasted.

Operating under the stores manager are ten supervisors who are the eyes and the ears of the department. These supervisors have no definite office or any office force, but are continually traveling over the road observing the use or possible waste of materials and to see that the stores control is carried out as planned. Certain of these supervisors are specialists, one on scrap, one on supplies, one on storing and binning, and another specializes on "frozen" items of material.

Due to the reorganization of this department several years ago, the inventory for the property has been materially lessened, from $87,500,000 to $64,000,000, and in 1925 to $50,000,000, due to the close adherence to minimum quantities in stock and by the close attention given to stores service.

Recent improvement in car design was the subject of a paper presented by W. C. Bolt, superintendent rolling stock and shops Eastern Massachusetts Street Railway. In the opinion of Mr. Bolt the electric railway industry is not up to date in the matter of car design. At least it has been slow in bringing out new models. While much valuable work has been done by the committee on unification of car design and the committee on equipment, he said that he thought another committee could do some worth-while work for the industry by studying European as well as American design. Germany and France have made radical changes in car design recently, while in this country there has been developed a car of less weight but very much resembling the car of 20 to 30 years ago. This, Mr. Bolt thought, is not sufficient to keep abreast of the times. Continuing, he gave an outline of the developments in car design on the Eastern Massachusetts Street Railway system. An abstract of his paper appears on page 207.

Mechanical improvements to reduce maintenance costs were discribed by W. L. Welter, Public Service Railway, Newark, N. J. More than 5,000 motor frames were revamped by electric welding. Smaller bearings were installed and oilers added. This resulted in a reduction of about 50 per cent in bearing costs in 1926 as compared with 1920. He mentioned also the method followed by Public Service Railway of changing the operating end of single-end cars when they were rebuilt for one-man operation, thus placing the large platform at the front. Pneumatic door engines and electric fare boxes and registers were installed. At present the company is experimenting with refitted semi-de luxe cars.

Accounts, auditing and organization were discussed by H. D. Chamberlain, auditor Delaware & Hudson Company, Albany. He said that the balance sheet as a whole is inexorable. It will eventually reveal the truth, and any attempt to make it show results not in accordance with the facts will result in only temporary advantages to those indulging in such practice, with compensating disadvantages later to them or to their successors.

The auditor cannot successfully keep accounts without a knowledge of the practical and technical phases of the operations of his company. Neither can an operating officer successfully handle the affairs of any important department without a more or less complete knowledge of accounting. This would seem to obligate both the accounting officer and the operating officer to a certain degree of broadmindedness.

The afternoon session ended with a moving picture film showing the manufacture of steel wheels and axles. This was accompanied by a talk by George A. Richardson, manager technical publicity department, Bethlehem Steel Company.

Accident Prevention Bonus —A Means to an End*

By A. L. Hodges

Assistant to Vice-President and General Manager Brooklyn City Railway

OFFERING of a bonus to conductors and motormen who operate their cars over a given period without an "at fault" accident is not new. We had the privilege of studying such plans as were in effect on other properties before adopting our "Accident Prevention Bonus" on Aug. 1, 1926.

During the fiscal year ended June 30, 1925, our company paid out $679,283 in accident damage claims. During the fiscal year ended June 30, 1926, we paid out $810,186, an increase of almost $131,000 in a twelve-month period. The 1925 figure represents 5.8 per cent of our operating revenue and the 1926 figure 6.95 per cent. These figures include the cost of our legal and claims departments, which will average $20,000 per month.

Various sorts of "no accident" contests were held as between depots, with talks by representatives of the management; charts were prepared showing just what the men on each line out of each depot were doing, but in spite of all this work our claim costs increased.

As a result it was decided to establish our accident prevention bonus plan, which became effective Aug. 1, 1926. An individual copy of this plan was put in the hands of every operator.

We feel that the results thus far obtained have been most gratifying. The first payments under this plan were made on Dec. 15, 1926, representing four months of operation under the bonus system. At that time we distributed $20,770, more than half of this amount, or $11,205, going to 747 men, in $15 denominations. Ten dollar checks were distributed to 727 men and $5 checks to 383 men. Also nineteen men (four conductors and fifteen motormen) received $20 checks. This meant that this last-named group worked 120 days out of a possible 122 days without an "at fault" accident.

On Dec. 15 we had 2,172 conductors and motormen in service and 1,876, or 86.4 per cent, participated in this award. It is perfectly obvious, therefore, that while we might have, and did have, some skeptics among the conductors and motormen when this plan was first proposed, we now have at least 1,876 men who are thoroughly sold on the idea and are plugging every minute to see how many times they can get on the bonus list for 1927.

For the last five months of 1926 (August, September, October, November and December) we had 5,433 accidents of all classes. For the same period in 1925 we had 6,006 accidents of all classes, a decrease of 573 accidents. Some 3,439 of these accidents, or 57.2 per cent were car and vehicle collisions. Of the total of 5,433 accidents occurring during the last five months of 1926 we considered our conductors and motormen were at fault for 2,229, or 41 per cent. In other words, 49 per cent of our accidents are caused by the carelessness, selfishness or ignorance of the other fellow, and the most popular indoor sport in this great city is to try and get the railway companies to pay out their hard-earned nickles in this class of accident.

During the month of August our men were at fault for 45.5 per cent of the accidents. This percentage of "at fault" or "preventable" accidents has shown a steady decrease and for December was 38.3 per cent, the average for the five months being 41 per cent.

I know you are all thinking about the probable or possible increase in "blind" or unreported cases. That is a bugbear set up by most claims men whenever accident bonus is mentioned. Our experience during the last five months of 1926 in this connection has been most gratifying. During this period we received 128 blind accidents and for the same period in 1925 we received 194, a decrease of 33 per cent. This certainly should dispel any antagonism to an accident prevention bonus from the no-report viewpoint.

It is very difficult, on account of prolonged litigation in most claims work, to give the definite monetary savings, especially when the plan has been effective for so short a time. However, our claims payments for the first half of the fiscal year ended Dec. 31, 1926, were $349,567, which is 6.1 per cent of the operating revenue. If this same rate is continued, and we firmly believe that it will be, we will have an expenditure of $700,000 for the fiscal year, which will be $110,000 under 1926.

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*Abstract of paper presented at New York Electric Railway Association, New York, N. Y., Jan. 25, 1927.

As a further argument along this line let me point out that our 1925 payments on 1925 accidents amounted to $260,945, while our 1926 payments on 1926 accidents were $231,571, a decrease in current payments of $29,373.

Accident Prevention Work on Third Avenue System*

By Dr. C. P. Segard
Assistant Secretary
Third Avenue Railway System,
New York, N. Y.

THE approach to accident prevention and safety has changed because the factors involved have changed. Traffic accidents were few when the horse-drawn vehicle was in vogue. Our accidents were mostly in the shops, where machinery was not well designed nor well guarded. To-day the situation is reversed in two ways. Industry has cut accidents down to a small fraction of what they were and traffic accidents now head the list. Individuals were also personally responsible in the days of unguarded machinery and slow traffic, with automobiles averaging 5 to 8 miles an hour. But when the speed doubled and machinery became, to all intents, foolproof personal responsibility and contributory negligence stopped breathing and turned cold.

Special training should be instigated so that in emergencies the right thing is done by force of habit. If the motorists who are involved in the majority of traffic accidents had the habit training in starting, stopping, cautionary and emergency operation that is given to platform men accidents would decrease.

Two groups of accidents that are of personal interest are the passenger and pedestrian group. In my opinion the trolley is the safest mode of transportation on the street to-day. The passenger and pedestrian group live in their homes under more hazardous conditions than any public would stand for. Many conditions of poor stairs, hazardous gas and electric equipment and broken stepladders in the home would not be tolerated by any street railway.

Coming now to a question of bonus as a means of accident prevention, as a first consideration it is part of the job of all of us to give safe service. Congestion of population, great increase in autos, traffic regulations, passengers per car-mile, private right-of-way and speed of general traffic are all factors that affect the accident ratio. They are all variable factors in that they affect one run and do not affect another. Neither can their efficacy be valued. For these reasons I believe that a bonus plan is but a temporary expedient that will cause new problems. Human weakness is such that every party involved lays the blame on the other. Your human classification of "who is to blame" can cause only dissatisfaction. Severity of the accident prevented cannot be measured. In view of all of these factors I am at a loss to understand how a bonus system can be equitable. In addition there is always the knowledge that the fellow who does nothing never has an accident. In other words, you can eliminate every accident by increasing the cost of transportation, decreasing your speed and slowing of traffic.

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*Abstract of paper presented at New York Electric Railway Association, New York, N. Y., Jan. 25, 1927.

New England Street Railway Club to Hold February Meeting

NEW ENGLAND STREET RAILWAY CLUB will hold a meeting on Feb. 3 at the Copley Plaza Hotel, Boston, Mass. The afternoon session will be called at 3 p.m., at which session, "Buses—Mechanical Drive and Electric Drive" will be the subject for discussion by speakers: Charles Froesch, engineer Mack Motor Truck Company; R. E. Fielder, sales engineer Yellow Truck & Coach Manufacturing Company; and J. C. Thirlwall, engineer General Electric Company. At 5:30 there will be an executive committee meeting. And in the evening Hon. Ralph S. Bauer, Mayor of Lynn, Mass., will address the meeting.

The secretary requests that reservations for the dinner, $2.50 per plate, be mailed immediately.

Equipment Men for Southern Properties Meet in Memphis

PLENTY of action pervaded the eleventh semi-annual meeting of the Electric Railway Association of Equipment Men, Southern Properties, at the three-day session in Memphis, Tenn., Jan. 26-29. More than 100 delegates were in attendance.

In his opening address Mayor Rowlett Paine emphasized the splendid co-operative spirit that exists between the Memphis Street Railway and the city of Memphis. A. D. McWhorter, president of the association and general superintendent of the company, visualized the magnitude of the railway industry for the members present by reviewing the subject in actual figures. He stated that the industry represented an investment of more than $5,000,000,000, with 300,000 people in its employ and an annual payroll of $300,000,000. In 1926 the industry transported more than 16,000,000,000 passengers. He also pointed out that 484 companies were operating 20,701 one-man cars. He supplemented this statement with a declaration of the fact that he believed the motor vehicle would be a co-operative factor rather than a competitive.

The subject "Modernization of Cars and Better Maintenance Practices" was discussed by E. W. Ford, vice-president of the Memphis Street Railway. Other subjects discussed were: "Modern Railway Control," by C. J. Axtell, special railway engineer General Electric Company; "Treadle Operation," by R. S. Frehse of the National Pneumatic Company; "Experience with Safety Cars," by T. R. Bristol, assistant superintendent of equipment of the Georgia Railway & Power Company; "Importance and Methods of Instructing Safety Car Operators," by E. R. Ray, employment agent of Memphis Street Railway; "Essential Features of Modern Street Cars," by E. A. Palmer, special railway engineer Westinghouse Electric & Manufacturing Company; and "Co-operation," by J. L. Brown, master mechanic of the Dallas Railway.

Delegates were taken on an inspection tour to the Memphis Street Railway's shops, carhouses, service building and power house. Among the entertainment features was a banquet and ball on Thursday evening in the Louis XVI ballroom of the Hotel Peabody, the headquarters of the association.

American Association News

Association Collecting Data on Insurance

QUESTIONNAIRES calling for data on their insurance experience in 1926 have been mailed out from association headquarters to all electric railway companies. This is on behalf of the committee on insurance, which, under the chairmanship of Paul E. Wilson, vice-president Cleveland Railway, is charged with the task of gathering accurate insurance data from the whole electric railway industry as a basis for its study of the insurance problem with a view to improving the industry's position in respect to insurance.

It is of vital importance to the success of the committee's work that it receive answers to its questionnaire from every electric railway in the country.

Every company, therefore, without exception, whether a member of the association or not, is urged to give careful study to the committee's questionnaire and to return it promptly to headquarters, filled out with the data requested.

Transportation Man and His Job

ON FRIDAY, Feb. 4, a meeting of the Metropolitan Section, American Electric Railway Association, will be held at 8 p.m. at the Engineering Societies Building, New York City. "The transportation man and his job" will be the general subject of discussion. G. T. Geer, secretary Third Avenue Railway, New York City, and Major J. S. S. Richardson, Pennsylvania Public Utility Information Bureau, will treat of various phases of this subject. Isabel Dazie, secretary woman's committee, Public Relations Section, N.E.L.A., will talk on "woman's place in the public utility field." Before the meeting the usual Dutch treat dinner will be held at Friedlander's restaurant.

The News of the Industry

Now They Know What They Miss

Residents in the communities and various suburban towns along the route of the Grand Rapids, Holland & Chicago Railroad, which discontinued service, sold its equipment, buildings and right-of-way several weeks ago, are bending every effort to have railway transportation restored to their communities.

Since the interurban company ceased operations factory workers, office clerks and women shoppers have permitted themselves to be packed into buses, after long waits, for the ride into the city or home. Four buses were placed in service at first by the bus company that is presuming to cover the territory, but it now has twelve in operation, and a Chicago Shore line bus company had added a commuter service. Still the service is inadequate to care for the demand of the residents along the route.

Seeing no relief in transportation, weary of the inconveniences and the irregularities, these residents are now attempting to form a company, lease the cars, right-of-way and purchase power from the Consumers Power Company, which bought the right-of-way for its power lines, and attempt to restore the old order of things.

The interurban suspended because of lack of patronage. Since service was withdrawn property values in the several villages, towns and suburban districts have slumped and new homes in process of building are being left unfinished pending the outcome of the efforts to re-establish the line. Lumber firms are instituting legal action against home and property owners for materials, hoping to collect before property values decline and jeopardize their liens. Factory workers from these districts who used their autos in preference to the interurban service now find parking restrictions in the city more closely drawn.

So, grasping at any plan that would partly restore the old-time interurban service, reduce accidents and permit wives of workers in the villages to go to Grand Rapids to shop and attend to other necessary duties, the much-agitated residents are seeking to effect organization of all suburban communities interested in resumption of interurban railway service between Grand Rapids and Jenison, a distance of about 8 miles, and serving a population of about 30,000.

H. T. Slaght, president of the Grandville State Bank, has been elected general chairman of the organization for the sale of stock in the United Suburban Railway, the name of the proposed company. Villagers, farmers and all who will pledge their support are being solicited. Subscriptions from $10 to $1,000 and over are being solicited. The keynote of the soliciting committee's plea is loyalty to the new company backed by patronage—if the wheels ever get turning.

A mass meeting was held on Jan. 21 in Wyoming park and solicitors were instructed by Mr. Slaght in anticipation of starting work the next morning. Committees are being formed in Galewood, Beverly, Homewood, Burlingame, Ivanrest and other communities. Every resident will be asked to subscribe.

Meanwhile the wrecking company from Chicago and H. Braudy & Sons, Grand Rapids, have completed the work of tearing up the track between Zeeland and Holland. The right-of-way between Saugatuck and Holland already has been cleared.

Manufacturing and other interests in Saugatuck made an effort to finance the purchase of rails, with the idea in mind of establishing a gasoline engine service between that town and Holland, but the move failed.

Chicago Extension Approved

Mayor Signs Ordinance Providing for a Day-to-Day Agreement for a Six Months Period—Public Referendum Suggested for Disputed Points in Proposed Transit Ordinance

CONTINUED operation of Chicago Surface Lines under a day-to-day franchise extension was assured on Jan. 27 by the Mayor signing an ordinance passed the day before by the City Council and approved by the federal court and the receivers of the Chicago Railways. The grant carries a six months limit cancelable at the city's option. The court relieved the city's anxiety by authorizing the receivers to continue payment of the percentage of net earnings stipulated under the terms of the grant under which the companies have been operating. The receivers of the Chicago Railways Company were also authorized to pay the interest on the first mortgage bonds and to utilize the present Surface Lines operating board.

Consideration of the consolidated surface and elevated lines ordinance framed some weeks ago by city and company attorneys was resumed on Jan. 21 by the local transportation committee of the Chicago City Council after several days inquiry into the independent proposal for the merging of all local transportation agencies into a $1,000,000,000 corporation recently laid before the committee by Henry A. Blair, president of the Chicago Surface Lines. Criticism of many of its important financial features caused the latter plan to be temporarily dropped from the program of discussion.

The new elevated-surface lines unification ordinance now in tentative form proposes the granting to a single company the right to operate surface, elevated, subway and bus lines under an indeterminate permit. New state legislation would be necessary before the city could grant such an ordinance or before the surface and elevated lines could consolidate. The present legal limit on street railway franchises in Illinois is 20 years.

The feeling exists in the local transportation committee, however, that little would be gained by seeking enabling legislation until the companies can come to a definite agreement on consolidation terms, reasonable valuation of all properties involved and a satisfactory rate of return. So long as these vital points remain unsettled, it is pointed out, no solution of the traction problem can be effected.

In event of a complete deadlock over these questions, Alderman Joseph B. McDonough, chairman of the committee, let it be known that he would submit all disputed points in the ordinance to the citizens' traction committee, which was appointed by the City Council last month to help bring about a settlement.

The question was raised by Corporation Counsel Francis X. Busch as to whether the city would have financial and legal authority to terminate the permit without long and involved litigation in case the company was not living up to the terms of its contract. He offered no opinion in this matter, but insisted that legislation creating the terminable permit would have to be coupled with adequate provision for local regulation. Mr. Busch also urged that all ordinances now pending before the committee be submitted to a referendum so that the voters would be afforded an opportunity to determine which of the several plans they preferred. Whichever plan received a majority of all votes cast, he said, would then be adopted.

Protests by Cyrus H. Adams, attorney for the Chicago Rapid Transit Company, to a clause in the terminable permit ordinance which provides that the new company taking over all transportation agencies should bear the expense of removing tracks and structures thought unnecessary evoked a lengthy discussion of that feature of the measure. Mr. Adams contended that the provision might be expensive to his company because the removal of the entire Loop elevated structure may be ordered. The obsolete trackage of the surface lines that would come under the order would be negligible in comparison, he declared. The committee finally overruled the objections, however, by voting to retain that feature in the tentative ordinance. Leonard A. Busby, president of the Chicago City Railway, and Weymouth Kirkland, attorney for the Chicago Railways receivers, agreed to accept the feature without disputing it.

The decision to require the company which receives the new ordinance to make surface lines extensions of 30 miles of single track each year for the first five years was one of the few points in which the committee was in complete accord. No recommendations were made as to elevated line extensions as attorneys for the rapid transit company have not indicated how much the company would be willing to undertake in this period.

At another meeting on Jan. 25, the subject of a suitable contract between the city and the company with regard to building and operating a subway was exhaustively studied. The committee hopes to complete its study of the ordinance in about ten days or two weeks.

Local exponents of municipal ownership for public utilities, recently organized as the "Detroit Plan Traction Ownership Club," are accusing Mayor William E. Dever, once a strong advocate of city ownership of the street car lines, of desertion from his former pledge and of seeking to avoid a public declaration of his attitude toward the present traction franchise negotiations.

Under the leadership of Henry M. Ashton, a local attorney, members of the club have announced their intention of fighting the plan to grant a new franchise to the Surface Lines. They demand that the city purchase the properties, as was done in Detroit when that municipality took over the street car lines at the end of their franchise period.

Seattle in Throes of Suit

Theater Owner Demands City Must Pay Municipal Railway Employees—Judge Hall Sums Up Railway Tangle—"A $5,000,000 Utility Is Not Worthless," He Claims

SUIT to compel the city of Seattle, Wash., to pay in cash employees of the Seattle Municipal Railway and all other expenses of operating the railway and to enjoin the city from paying to Stone & Webster any further money on the purchase contract for the line until all labor and operating claims are paid has been filed in the Superior Court by John G. Von Herberg, Seattle theater owner. The court issued a temporary order restraining the city from paying any further money on the purchase price of the street railway until labor and operating claims have been paid. The suit came as a complete surprise to city officials and there are varied opinions as to who is back of the move.

In his complaint Mr. Von Herberg asks the court not only to construe the contract of sale as requiring labor and operating expenses to be paid out of the street railway earnings ahead of any further payments due Stone & Webster but also asks that the city be prevented from using funds from any other municipal utility for the relief of the street railway, for operating, maintenance, purchase, replacement or for any other purpose. The court also is asked to direct the city to pay into the street railway operating fund all of the gross revenues of the line.

The suit attacks the City Council's position that bond redemption and interest payments of the street railway lines must be paid out of the street railway funds before the salaries of the employees. It came on the eve of the third consecutive "payday" in which street car men were paid in warrants, while the earnings of the line are diverted into the bond redemption and interest fund. Mr. Von Herberg on the Dec. 24 pay day took care of the employees' warrants and announced himself ready to cash the Jan. 10 warrants, but the employees found no difficulty in cashing their checks throughout the city.

On Feb. 1 the Seattle Municipal Railway must have $1,151,845 to send to New York for March 1 bond redemption and interest, and to provide this sum all earnings of the lines have been diverted into the bond redemption fund and the payroll and material charges have been placed on warrant. Unless enjoined by the court, this sum will be forwarded before March 1. In his complaint Mr. Von Herberg sets forth that no payroll of the Municipal Street Railway can be met in cash for a period of at least five months. It charges that the city is accumulating all the revenues of the railway and keeping them on hand to meet the payment due in March; that the city unlawfully transferred, on Dec. 21 last, $135,000 from the light and water fund to the railway fund, and that it has since dipped into the water fund and wrongfully transferred $10,000 from the water to the railway.

FORMER OWNERS WANT TO INTERVENE

Concluding an all-day hearing on the Von Herberg suit, Judge Calvin S. Hall of the Superior Court continued the case until Jan. 25. Previous to the hearing, and coincident with an attack by the city on the Von Herberg suit, the Puget Sound Power & Light Company, representing Stone & Webster interests, who sold the railway to the city in 1919, filed an action in the federal court in which it names both the city and Mr. Von Herberg as defendants, asking that they be restrained from withholding payment of the bond redemption and interest on the railway purchase contract until operating expenses of the line have been paid. In the city's return on the show cause order in the Von Herberg suit it asks that the plaintiff make the Puget Sound company a party to the suit, and in the federal court the Puget Sound company asks that Mr. Von Herberg be restrained from making the company a party to his action against the city.

The company, in its petition, asks for a temporary order restraining the city from using any portion of the gross earnings of the Municipal Street Railway to pay operating expenses or any other inferior claims until after the annual installment on bonds and interest due March 1 has been paid. The Puget Sound company recites the terms of the purchase contract and asks that Mr. Von Herberg be bound by the decree in the Frank Twichell case, in which the validity of the purchase ordinance and the bonds was upheld. In its complaint the company calls attention to the fact that in the purchase contract the city obligates itself to pay bond redemption and interest out of the gross earnings of the railway, even though the amount remaining should be insufficient to pay the operating costs of the line. It cites that since the city took over the lines the gross earnings have amounted to more than $25,000,000, a large part of which has been devoted to the payment of operating expenses. It contends that the legality of the ordinance and the bonds has been upheld in court, and charges that the Von Herberg action against the city is an effort to cause the city to default on its bond and interest payments, thereby doing irreparable injury to the holders of the bonds. The motion asks that the city be required to perform its part of the contract and to pay daily into the special bond and interest fund the entire gross earnings of the railways so the payments due March 1 will be on hand in the fund Feb. 1 as the contract requires.

The city, in its return to the Superior Court on the order to show cause why a temporary injunction should not be issued restraining the railway from putting any more money in the bond fund until the payroll has been met, filed a motion asking that the plaintiff, Von Herberg, bring into the action the Puget Sound Power & Light Company, so that any decision that may be made will be binding on the company as well as the city. The city also asserts that two causes of action have been improperly joined, a mandamus and an injunction action.

Judge Calvin S. Hall, commented at length on the railway situation, saying among other things:

> That the street car employees must be paid, and, that so far as he is able to do so, he will see that they are paid.
>
> That the corporate authorities have operated the railway efficiently and have accomplished what seemed impossible.
>
> That the railway is solvent.
>
> That he does not believe the City Council will make illegal transfer of funds.
>
> That the city owns the utility and that the power company has only a lien on the earnings and could not take it back.
>
> That the taxpayers have paid nothing, own nothing and never will pay anything on the railway—only the people who ride will pay.
>
> That the purchase contract is impossible of performance because the payments are too large.
>
> That the annual payments on the purchase bonds should be reduced from $833,000 to $400,000 a year.

Judge Hall declares that if it was apparent on Jan. 25 that the employees would not receive their pay, he would announce a decision, and continued in effect the temporary restraining order preventing the city from removing bond payment money out of the jurisdiction of the court.

Mayor Bertha K. Landes appeared before the Judge with the statement that she believed that the men would receive their pay on Jan. 25, the next railway payday. Judge Hall declared that if he could be assured that the men will get their money, he would not grant the restraining order.

After hearing the attorneys for both sides, Judge Hall made a statement in which he praised the accomplishments of Superintendent D. W. Henderson, Superintendent of Utilities Clark R. Jackson and the Council. He then continued thus:

> And I want to say that, in my opinion, if it ever comes to the Supreme Court, it will be held that due regard was not given for the payment of the cost of operation and the cost of maintenance in fixing this fixed amount of $833,000 annually, with interest. Neither the traction company nor the Council could have exercised its honest judgment and said that it would be able to pay that, because it amounted to 10 per cent upon $15,000,000.
>
> It has come to a point now where I believe the contract is impossible of performance, because the payments are too large to be made. The bondholders should recognize that fact, because if a receiver was appointed for the operation of the railway company, it would not mean that we would lose the railway. It would mean, in my opinion, that the cost of operation and maintenance would first be paid and then the bondholders would get what was left.
>
> The fair thing to do, in my opinion, would be for the traction company to acknowledge the fact that they exacted too much from the first; and instead of paying the balance of ten million dollars in twelve installments, that they make that twenty-five installments of $400,000 a year. Then the street car company would be solvent. The fund would be solvent then. Whatever additional amounts the utility could pay should be paid, but just bind the earnings to $400,000.
>
> I do not want to handicap the railway, and it is about time that the citizens of Seattle were not handicapping it, but should give full credit to those who are trying to work it out of the condition that it is in, and not by vexatious suits keep it in the minds of the public as being a utility that is worthless and discredited and thrown away, for it is not, as long as we have it and have paid $5,000,000 for it.

The city demurred to the Von Herberg application on the grounds that the court did not have jurisdiction in the case and that the bill of complaint did not constitute sufficient cause for action, but Judge Hall overruled the demurrer and the hearing proceeded on the application for the injunction.

Lord Ashfield for Complete Co-ordination Study

Lord Ashfield, first Baron of Southwell and chairman of the board of the Underground Electric Railways, London, has been making a visit in this country during the past few weeks. During this time he visited New York, Detroit, Washington, and other American cities. He returned to London Jan. 29. While in Detroit in discussing that city's transportation situation he said in part:

> Detroit, as well as other cities, should avoid the notion that the building of subways or the mere improvement of one branch of the system will meet any transportation difficulties it may have. These things should be done, of course, but they should be done with a view to co-ordinating all branches of the system.
>
> Buses will inevitably play an important part in the development of Detroit's transport system, but the street cars must be retained. The two should be operated as one system, even running on the same streets. Buses must be used in increasing numbers.

In speaking about subways, Lord Ashfield said:

> The work of constructing underground streets, for that is really what they are, should be started. And the subways should become part of the general transport system. At the outset, trolley cars in three or four car trains might be used to advantage on the underground streets.
>
> Subway construction is costly, but the results justify the outlay, just in the time saved the daily wayfarer. Time taken in traveling to and from work is time wasted, of no use to any one. Underlying discontent with transportation systems is, in most cases, slow service.
>
> The average speed of trolley cars and buses is 9 m.p.h.; subway trains—and I am not speaking of express trains—average 18 m.p.h. There is a time saving of 50 per cent. And, after all, time is money. I know of no city that needs an up-to-date transportation system more than Detroit, with its many factories in the outlying districts.
>
> The next step should be the drafting of plans of development of a co-ordinated system for the next ten years. And in exact proportion to the additional facilities provided, traffic will grow. We sometimes speak of "point of saturation," but I have never encountered this in the transportation business.

$175,000 for Another Milwaukee Cut-Off

Plans are under way by the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., providing for the construction of a third cut-off electric line with a view to improving the interurban service now provided from Milwaukee to Hales Corners, Muskego Center, Big Bend, Mukwonago and East Troy on the East Troy division and from Milwaukee to St. Martins, Wind Lake, Waterford, Rochester and Burlington on the Burlington division. Faster time will also be made to Lake Geneva, Elkhorn, Delavan and Beloit, from which cities patrons are carried to the East Troy-Burlington electric line by the company's bus feeder line.

According to the application, which is now before the commission for approval, the proposed cut-off, which will be about a mile in length, is to be built from the West Junction station of the Milwaukee - Waukesha - Watertown rapid transit line south to the Fruitland station on the Burlington-East Troy line. This project will cost approximately $175,000 and will mean a 20-minute reduction in the running time of electric trains to Burlington, East Troy and intermediate points. This saving in operating time will be achieved by running the Burlington-East Troy trains over the more direct rapid transit route instead of the present slow roundabout way through the south side district of Milwaukee and the city of West Allis. The new line is also expected to effect substantial operating economies.

The cut-off will tap a large area now without any form of public transportation. It will be built over a private right-of-way acquired by the company. Three bridges will be constructed, one over the company's West Allis-West Junction electric line tracks and the others over the Sparta and Madison divisions of the North Western Railroad, coupled with the elevation of tracks at one grade crossing and depressing of tracks at another crossing.

Construction work on the cut-off will be started immediately upon receipt of the commission's consent of the plan so that it may be completed and in operation by midsummer. It is just another evidence of the progressiveness of the company.

"Silent Watcher" Contest in Salt Lake City Rewards Employees

Thirty trainmen of the Utah Light & Traction Company, Salt Lake City, Utah, and their wives, together with several officials of the company, attended an informal dinner party on Wednesday evening, Jan. 12, at the Newhouse Hotel, Salt Lake City, as guests of *Kar Fax*, the public relations publication of the utility.

The company prides itself on the high type of its trainmen, and this belief was substantiated when *Kar Fax*, started its contest for the pre-Christmas shopping days. The "Silent Watcher," a young newspaper woman here, was selected to observe and report the good things she heard and saw in connection with trainmen's performance of their duties. Her familiarity with company rules, car routes and human characteristics in general was sufficient evidence of her competency to judge and report her observations.

A notice posted on the trainmen's bulletin board a day or so before the contest explained its purpose. The points were scored in this order:

1. Courtesy toward passengers.
2. Consideration for the aged and for children.
3. Efficient operation of cars—easy stops and starts.
4. Calling streets.
5. Neatness and cleanliness in appearance.
6. Neatness and cleanliness of cars.
7. Efforts made to make car riding safe, comfortable and pleasant.
8. Refraining from unnecesesary conversation.

All trainmen were eligible to compete. The trainmen were enthusiastic from the start and dubbed the "Silent Watcher" their "Guardian Angel." The reports received and results obtained were encouraging and satisfactory in every respect.

The task of selecting the winners was by no means an easy one. When it was completed written invitations were sent to the winning trainmen and their wives. Each lady, before she was seated at her table, received a rose. The public relations department representative was toastmaster. Short talks were made by some of the company officials, the "Silent Watcher" was introduced and made a few remarks, and Mayor C. C. Neslen, on behalf of the company, presented each trainman with a card of thanks and appreciation to which was attached a $5 gold piece.

St. Petersburg Bond Election Set for March 1

A referendum bond election is scheduled for March 1 in St. Petersburg, Fla. The purpose is to authorize the construction of a municipal belt line railway connecting the port of St. Petersburg with rail transportation. By unanimous vote of the five city commissioners present at the regular meeting of the board the election was passed on first reading. The issue of the municipal securities proposed will amount to $362,000. In taking action city officials pointed out that the industrial electric railway could be constructed for at least $30,000 less than the amount already voted and now remaining of the proceeds of the bond issue formerly authorized for the transit shed improvements.

New Franchise Draft in Kansas City

A tentative draft of the proposed 30-year franchise for the Kansas City Public Service Company, new owners of the railways system in Kansas City, Mo., has been drawn up by A. N. Gossett, chairman of the special committee of the City Council. The franchise embodies points already agreed upon by the committee and the Council. The franchise will be presented to the City Council and then considered at public hearings. Included among the proposals of the tentative franchise are:

A return of not more than $2,000,000 annually after the company has expended $3,300,000 in repairs in the next two or three years.

A sliding scale of fares based on an implied valuation of $25,000,000.

An additional expenditure of $3,300,000 in improvements and extensions.

Resumption of traffic through the Eighth Street tunnel into the central industrial district.

Construction of a concrete viaduct over Mill Creek Parkway near St. Luke's hospital.

A sliding scale for fare reductions based on the earnings of the company.

Increased frequency of the railway operation.

Maintenance of all present lines and extensions when needed.

Limitation of fare increases and decreases to one year.

Reduction of the city members of the company board of directors from five to two, one of whom will replace the city member of the board of control and will have authority to determine what constitutes improvements and repairs.

Inclusion in the new franchise of the obligations of the company to pave the streets between the car tracks, pay car licenses and viaduct rentals and assume other obligations of the Jost franchise.

The Council committee is composed of Mr. Gossett, H. L. McCune and Jasper Bell. John T. Barker, city counselor; E. F. Halstead, assistant city counselor, and Bennett C. Clark, general counsel for the Public Service Company, also will attend the sessions of the special franchise committee negotiating with the company in drafting a new railway franchise.

Commission Claims 8-Cent Fares in Buffalo Sufficient

Expert accountants in the employ of the New York Public Service Commission have submitted a report to the board saying that the International Railway has been earning an average of 8 per cent on the investment of its Buffalo, N. Y., property under the valuation as fixed by the commission. The commission in its answer filed in the United States District Court at Buffalo to the equity action brought by the International Railway, seeking to raise its fare in Buffalo from 8 to 10 cents, says the company has been operating at a profit under the present rate of fare. It also contends the present rate of fare is adequate and that if the company is losing money the commission is the proper authority to grant an increase, without taking the case into the federal court

The company in its equity action contends the 8-cent fare is not sufficient to pay operating expenses and that the rulings of the commission are confiscatory. It requests an injunction from the federal court restraining the commission and the cities in which it operates local and interurban lines from thwarting the efforts of the company to put higher tariffs into operation. The company's application for a 10-cent fare in Buffalo will be heard by the utilities board early in February.

Atlanta Wage Scale Renewed

The Georgia Railway & Power Company has just secured a wage contract for the coming year with its railway employees without any increase in the wage scale now in force. The new contract for 1927, which has just been signed by representatives of the company and of the local employees' union, has been under consideration for several weeks. The employees demanded a material increase. The company averred that under present circumstances it could not afford to pay more than the scale now in existence. A renewal of the present wage scale was finally agreed upon, with provision for negotiations in May looking to an increase in wages for railway operators. The continued scale in Atlanta runs from 49 to 54 cents an hour, with extra pay to one-man car operators.

Battle Won with Customer Is No Victory, Says Woman Writer

At least one woman has been found who has emancipated herself from the class of female fighters. She is Mary Loftus Hulsman, copy writer in the advertising department of the Philadelphia Company, Pittsburgh, Pa., who tells the employees of the Pittsburgh Railways "if you want to argue join a debating class at night, but don't practice on your passengers." That is only one of the many admonitions contained in a recently written booklet entitled "Employees' Service Code." The purpose back of her literary effort is to suggest new ways and to recall old ways of serving the public in the best way possible. In twelve pages, with illustrated paragraphs about some phase of electric railway operation, Miss Hulsman suggests to the conductors ways of winning over the ladies, dilates on the value of being good natured and stresses the value of knowing their city and avoiding accidents. Loyalty for the company and enthusiasm for the work, she believes, are assets without which success cannot be attained.

"Show Me the Way to Go Home"

ON BEING informed that one of the most successful operators in the electric railway business was formerly a show man, the editor of the Ottawa *Electric Railway News* said:

"Even at the present moment the successful street railway operator is a show man, responding through the medium of speedy, direct and comfortable service to the almost universal demand of the human race: 'Show me the way to go home.'"

Man Failure Responsible for Tragedy at Superior

An investigation conducted by Chairman Gettle of the Wisconsin Railroad Commission into the one-man car accident at Superior, Wis., has disclosed that the accident was due only to error by the human element and was not attributable to the one-man type of car. In this case the operator of the car, crossing the railroad track without first walking out upon it ahead of his car, saw the approaching train and, instead of crashing forward through the lowered gates, attempted to back off the tracks, then started forward again, and the car was caught by the train as it was finally pushing on ahead. The car was equipped with the required safety exits.

In reply to the wave of opposition against the use of the one-man car, statewide in character since the accident, Mr. Gettle declared that in all other cities now served in part or whole by one-man cars the record of accidents is no worse than is that experienced under two-man operation. In many instances the accident record of the one-man car is better than during the time two-man cars operated on the same streets. It is not believed that the accident will in any way change the commission's stand to continue to permit the operation of the smaller cars on those lines where they appear to be the most economical without retarding service.

On the other hand it is said that several legislators are gathering information preparatory to presenting bills for passage by the present Legislature requiring every street car to be manned by a crew of two men. To this end eight members of the Assembly from Milwaukee plan to attack the one-man car issue from another angle. They propose to introduce a bill taking the power of utility regulation out of the hands of the commission and giving it to local authorities.

The Railroad Commission has scheduled a hearing early in February on the application of the Superior Council to have one-man cars entirely withdrawn.

Rockford Franchise Adopted

The City Council of Rockford, Ill., recently adopted a new twenty-year franchise for the Rockford Public Service Company, with many changes from the franchise granted the Rockford City Traction Company in 1925. Two dissenting votes were cast. The new franchise grants many provisions sought by Milton Ellis, president and general manager of the new company. The new franchise exempts the railway from paving between its rails by direct assessment after five streets have been paved while the company bears the cost of paving between those rails; it must pay $50 annually for each car or bus it operates, a tax of $4,000 under the present equipment; may use one-man cars; must clear snow on its right-of-way within 48 hours, clearing the road to within a few feet of the curb. Wherever lines are abandoned the company is to remove tracks and restore paving to its original condition.

Louisville's "Best Public Servant" to Be Named

A notice has been posted on the various bulletin boards around the property of the Louisville Railway, Louisville, Ky., in connection with the Anthony F. Connelly award for 1926. Employees are urged to secure the necessary nominating blanks from the foreman and send in to the award committee the names of those considered best suited for the designation "Best Public Servant."

The notice tells the employees that in December, 1925, the directors of the Louisville Railway announced that as they had been inspired by the general effort on the part of the employees toward increased safety and efficiency they felt that this effort should be tangibly recognized and at the same time set up as a permanent recognition of the outstanding record of service of Anthony F. Connelly. The Anthony F. Connelly award carries an annual cash prize of $75 and a medal known as the Connelly Award, to be given to the employee of the Louisville Railway who during the calendar year rendered in his individual capacity the most useful or efficient service to the public which it served. All employees except officers and department heads are eligible for the award. The award is based either upon a sustained record of excellent public service throughout the year or upon one or more individual instances of outstanding and unusual public service, whichever, in the opinion of the award committee, constitutes the greatest contribution to public service record of the company. The notice was signed by James P. Barnes, president.

Work on New Kansas City Viaduct to Start

The Kansas City Public Service Company, Kansas City, Mo., has just begun work on its plans for a new viaduct to be built over Mill Creek Parkway at 43d Street. The new viaduct will be of reinforced concrete. During the process of construction a temporary trestle just north of the old viaduct is being used.

In all probability the roadway will be closed during the months of April and May to allow construction on parts of the new viaduct, according to William G. Woolfolk, president of the company. The viaduct is used constantly, being a Westport freight spur.

News Notes

Good Record in 1926.—During 1926 the number of accidents, cars charged off for defects, overhead emergency troubles and the number of derailments decreased substantially on the lines of the Toronto Transportation Commission, Toronto, Canada, over the previous year. The number of accidents per million car-miles in 1926 was 326, against 338 in 1925, 420 in 1924, 460 in 1923 and 512 in 1922. The company claims that the constant decrease is due largely to the vigilance and efficiency on the part of the men, the new and reconstructed rolling stock and the elimination of wyes.

Chair Car Service Withdrawn. — Operation of limited chair cars has been withdrawn by the Chicago, South Bend & Northern Indiana Railway on its South Bend-Michigan City division.

Early Report on Zone System.—The Tacoma Railway & Power Company, Tacoma, Wash., is now operating its railway lines under the zone system, effective from Dec. 20 until March 1, under the schedule filed with the State Department of Public Works. T. F. Marsh, superintendent of transportation, reports that the first few days operation indicate that the 5-cent downtown fare will prove popular with close-in dwellers and will increase this class of riding. No great confusion or difficulty was encountered in distinguishing car riders who traveled to the outside, or 10-cent fare zone. All fares are now collected as the passengers leave the cars instead of, as heretofore, upon entering.

Leavenworth Submits New Grant.—The City Commission of Leavenworth, Kan., submitted on Jan. 17 to the Kansas City, Leavenworth & Western Railway the draft of a new franchise ordinance. The new grant would permit the company to operate over the streets of the city for twenty years.

News Sheet Reappears. — The Augusta-Aiken Railway & Electric Corporation, Augusta, Ga., has resumed publication of the Augusta-Aiken *News Letter.* The sheet will be published occasionally and will be arranged by employees for circulation among the employees. The last issue of the paper came from the press in March, 1924.

Gives Gift to Parting Official.—Members of the Street Railway Employees' Union, No. 313, Rock Island, Ill., as an expression of regret at the departure of Thomas C. Roderick, manager of the Illinois lines of the Tri-City Railway, presented to him a handsome desk set at a recent farewell reception in the assembly rooms of the Rock Island carhouse. H. E. Wendell, president of the union, made the presentation. Mr. Roderick leaves Feb. 1 to become general manager of the Ottumwa Gas Company.

Hears Foes of Subway Pact.—The Pennsylvania Public Service Commission heard argument on Jan. 24 from opponents of the contract between the city of Philadelphia and the Philadelphia Rapid Transit Company to construct a two-track subway in Chestnut Street. Counsel for the company, the city and the underlying lines summed up the case by emphasizing the necessity for the improvement and defending the agreement. The objectors claimed that the application was unconstitutional because the city was lending money to a corporation and also that it was illegal in that it violated the act of 1917 limiting contracts between municipalities and utilities to 50 years. Councilman Roper and former Public Service Commissioner J. Henry Scattergood opposed the scheme. Other representatives of organizations opposing the lease included C. Oscar Beasley for the United Business Men's Association.

Foreign News

Electrification of French Railroads Progresses

Electrification of the Paris-Orleans railroad line is progressing steadily. Recently ten passenger trains were carried by electric power between Paris and Les Aubrais, a distance of 123 kilometers. Before the end of 1926, electric traffic will be complete as far as Vierzon, and the power for the route to this point will be supplied by the hydro-electric mill of Eguzon, representing a total installed power of 50,000 kw.

The electrification program of the Paris-Orléans line includes the Paris-Brives section of the Paris-Toulouse line and the two transversal lines, St. Sulpice-Gannat and Brives-Clermont.

Safety First the Aim in Keighley

Despite the alarming increase of fatal street accidents in the London area, accidents caused by trolley cars are on the decline and only four are recorded for the last quarter of the year ending with the month of September as compared with 29 on the bus. The Keighley Corporation Tramways is helping to reduce still more the mortality caused by vehicular traffic by distributing to all of its traffic employees, small leaflets—miniature reproductions of the safety first posters used by the National Safety First Association.

Proposed Tunnel Through Mont Blanc.—Much interest is being taken in Italy in a project for the construction of a tunnel through Mont Blanc in order to give better means of railway communication with Italy, France and western Europe. The tunnnel would be a little more than 9 miles in length, but although not so long as the Simplon tunnel, which is nearly 11 miles, its cost is expected to be much greater. The project would include the construction of an electric railroad.

New Railway Offices Approved.—The directors of the London Underground Railway companies have approved the design for new headquarters which will be erected on Broadway, Westminster, where the present offices are situated. The plan is in the form of a Latin cross, the center portion of which contains entrance halls, staircases, and lifts, while the four arms give the office accommodation. The north wing will form on the ground floor the new entrance to St. James Park Station and will connect with the existing offices. The building is estimated to cost £300,000. The maximum height will be 100 ft.

Trackless Trolley System Adopted by Chesterfield, England. — Chesterfield Town Council has recently announced a decision to change its entire system from tram cars to trolley buses and as a result has placed a contract for fourteen trolley buses to be put into operation as soon as the alteration of overhead equipment is completed.

Recent Bus Developments

New York Awards to Be Narrowed to Seven Bidders

The Board of Estimate of New York City on Jan. 27 adopted resolutions directing the Board of Transportation to prepare franchise contracts with seven bus petitioners. Originally there were 72 such applicants. They submitted 106 separate petitions. The adoption of the resolutions by the board was in ratification of an agreement reached at an executive session on Jan. 26.

The companies for which the Board of Transportation was directed to prepare franchise contracts are the Equitable Coach Company, for a franchise for Manhattan, Brooklyn and Queens; the Surface Transportation Corporation, a Third Avenue Railway subsidiary, for a franchise for the Bronx; the Manhattan Surface Coach Company, a subsidiary of the New York Railways, which is seeking a franchise for Manhattan; the Coney Island & Gravesend Bus Corporation, a subsidiary of the Brooklyn-Manhattan Transit Corporation, and the Brooklyn City Railroad, which asks a franchise for Brooklyn; the Rauchwerger Bus Company, which seeks a Queens franchise, and the Tompkins Bus Company and the Staten Island Coach Company, a subsidiary of the Richmond Light & Railroad Company, each of which is an applicant for a bus franchise for Richmond.

The Board of Estimate set March 22 as the date for a public hearing on these contracts. Presumably the board will award the actual franchises soon after this meeting. The first regularly scheduled meeting of the board at which this can be done will be on March 24.

Gary Subsidiary Buys Coach Company

Authority to purchase the equipment of the Calumet Motor Coach Company, Hammond, Ind., was granted on Jan. 15 by the Indiana Public Service Commission to the Shore Line Motor Coach Company, a subsidiary of the Gary Railways and the Chicago, South Shore & South Bend Railroad. The capital stock of the Calumet Motor Coach Company, which operates ten bus routes in Hammond and adjoining communities, including two lines between Hammond and Chicago, was purchased last July from its former owners by the Midland Utilities Company, an investment company interested in the Shore Line Motor Coach Company and other utilities in that section of Indiana.

In a separate order the commission authorized the Gary Railways and the Chicago, South Shore & South Bend Railroad, each to buy at not less than $10 a share 13,614 shares of common stock of the Shore Line Motor Coach Company. Sale of this stock will enable the latter company to buy the equipment of the Calumet company.

Certificates of convenience and necessity were simultaneously issued by the commission to the Gary Railways authorizing the operation of two new bus routes in the city of Gary.

Bill Would Provide Tax on Buses

Corporation Counsel Countryman of Hartford, Conn., as a private citizen, and not as legal adviser, has drafted a proposed bill concerning the maintenance of highways used by street railways for the transportation of passengers by buses. It provides that for the transporting of passengers by bus over the streets of the city a company will pay to the municipality the cost of maintaining a street area which would be occupied by a single track of street railway plus an additional 16 in.

Changes Made in Lincoln.—The Lincoln Traction Company, Lincoln, Neb., has been given practically a free hand by the Nebraska Railway Commission in rearranging its downtown service by permitting it to add twelve more buses and to dispense with the operation of as many electric cars. Five different lines are affected.

Would Alternate with Buses.—The Northwest Traction Company, a subsidiary of the Puget Sound Power & Light Company, Seattle, operating sixteen round trips daily between Mount Vernon and Bellingham, has been permitted, in an order from the Department of Public Works, to take off half the cars and alternate with buses upon the Pacific Highway connecting Burlington, Skagit County and Bellingham. The application stated that the interurban system had met with greatly decreased earnings during the past several years and that it was thought buses along the highway, which parallel the railway's tracks, would render better service, if alternated with the electric cars, and would result in increased earnings.

Bus Lines Under Consideration.—Monroe, La., is considering a plan for operating bus lines in connection with its Municipal Street Railway. At a meeting of the junior board of the Chamber of Commerce the plan was given approval. It was said that such service would provide the city with fuller facilities on an economical basis. It was pointed out that the rapid growth of the city in recent years had brought into being two or three sections of the city to which street car service was not conveniently available.

Would Substitute Buses.—The street and the public utility committees of the City Council of Gadsden, Ala., it is reported, will take up with the Alabama Power Company the proposition to abandon railway tracks on the Ewing Avenue and Walnut Street lines and substitute bus service. The suggestion to abandon the trolleys was made by President Evan J. Owen of the Council.

Will Purchase Bus Line.—Clark V. Wood, president of the Worcester Consolidated Street Railway, Worcester, Mass., has announced that negotiations have been completed for the purchase by the railway of the Carter Bus Lines, Worcester. The Carter lines operate between Salem Square and the Lake District in Worcester, a large territory not directly served by the Consolidated where there are several hundred permanent residents and a much larger summer colony.

Cars Will Be Abandoned.—The City Council of Mattoon, Ill., has granted the request of the Central Illinois Traction Company to substitute buses for trolley cars in the city of Mattoon. The company recently asserted that for a number of years the lines were being operated at a loss, but of late the deficit reached such proportions that suspension became imperative. The rails will be torn up and trolley poles taken down. Three to four buses will be operated as traffic conditions warrant.

Seeks to Win Bus Grant.—The Grand Rapids Trust Company, receiver for the Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich., seeking to protect the railway's request for a bus franchise paralleling its route against a similar petition of the Greyhound Bus Line Company, has filed a statement with the Michigan Public Utilities Commission. The interurban company is prepared to put on the highway buses supplementing its railway service within ten days after approval of its application by the commission. Plans hinging on the approval call for hourly service by bus or railway from Grand Rapids, Grand Haven and Muskegon with transfer privileges at junction points.

New Line Opened.—The East St. Louis & Suburban Railway on Jan. 17 opened its bus line between Edwardsville and Glen Carbon, Ill. It replaces a private bus line formerly operated without a certificate from the Illinois Commerce Commission.

Buses Succeed Cars.—The Milford & Uxbridge Street Railway has received permission to abandon its railway lines between Milford and Hopkinton, Mass. Following this approval, the Milford Selectmen granted a permit to the Johnson Bus Lines, Inc., Milford, to operate buses from the Milford-Hopkinton town line to the Milford-Hopedale town line.

Would Run Line Between Olean and Bradford Junction.—The Olean, Bradford & Salamanca Bus Line, Inc., Olean, N. Y., subsidiary of the Olean, Bradford & Salamanca Railway, on Jan. 19, filed a petition with the Public Service Commission for permission to operate a bus line in the city of Olean, town and village of Allegany and the towns of Carrollton and Great Valley and the village of Limestone. This line is to be operated between Olean and Bradford Junction, sometimes called "Seneca Junction," through the village of Limestone to the state line and also to the city of Salamanca. The commission will hold a public hearing.

Financial and Corporate

Hearing on Boston Elevated

First Public Consideration of Matter of Disposition of Property with Passing of Public Control

The proposition to liquidate the present Boston Elevated Railway, Boston, Mass., and organize the Boston Transit System as a new public corporation to take over the business under a term of 40 or 50 years of public control was considered publicly for the first time at a hearing in the Massachusetts Legislature on Jan. 25. It was explained in detail by Henry I. Harriman, chairman of the Metropolitan Planning Division, which sponsors the proposition, and by B. Loring Young, former speaker of the Massachusetts House of Representatives.

The extension of the Boston Elevated, as outlined in the bill, would invade territory that is served by the Eastern Massachusetts and by the railroads entering Boston. Regarding the steam railroads Mr. Harriman told the legislative committee that they are in favor of the proposition as they would welcome being relieved of the burden of passenger service in and near Boston. The Eastern Massachusetts might not be so willing to give up territory to the Boston Elevated.

Briefly, it is proposed to extend the rapid transit lines in Boston from East Boston to Brighton in one direction and from Lechmere Square to Huntington Avenue in another direction, to parallel some of the railroads because of the cheaper cost of construction, and so push the Elevated lines out to Reading and to Winchester and Woburn, run them out to the Waltham branch of the Boston & Maine and to the Newton Circuit of the Boston & Albany. Proposed extensions would make use of existing subways and tunnels in which platforms would be lengthened so as to permit of the operation of four and five-car trains. Surface cars would be taken out of the subways.

Financing of these projects, as they are needed, would be facilitated by the state guarantee back of the new stock issues. This would make these issues almost equivalent to state bonds, carrying a lower dividend rate than the present Elevated Railway stock issues. A part of the saving on stock dividend would go toward a sinking fund with which the Commonwealth of Massachusetts would buy the road at the end of 40 or 50 years.

There will probably be a bitter fight in the Legislature during the next few weeks over these propositions.

Consolidation of Georgia Properties Approved

Preferred and common stockholders of Georgia Railway & Electric Company, Atlanta, Ga., have approved the consolidation of public utility properties acquired by the Georgia Power Company. Other properties involved in the consolidation are East Georgia Power Company, Athens Railway & Electric Company and Rome Railway & Light Company.

Consolidation of the utility interests involves the cancellation of the 999-year lease under which the railways of Atlanta are controlled by the Georgia Railway & Power Company.

Under terms of the consolidation, common stock in the electric company will be exchanged for 6 per cent preferred stock in the Georgia Power Company on the basis of 1¼ shares of Power Company preferred for one share of electric company common.

Preferred shares of the electric company will be exchanged for preferred shares in the Georgia Power Company on the basis of one share of 6 per cent preferred for one share of 5 per cent non-cumulative preferred in the electric company.

Before the consolidation can be consummated it will be necessary for the State Public Service Commission to decide whether it is in the public interest.

Good Showing in Grand Rapids

Net Income Was $9,929 in 1926, Compared with $67,541 Deficit in 1925—Approximately 40 Per Cent of Price of New Rail Coaches Paid—Balance Due in Convenient Monthly Payments

GROSS earnings of the Grand Rapids Railway, Grand Rapids, Mich., in 1926 increased $37,978 over 1925. This is noted in the annual report to the stockholders for the year ended Dec. 31, 1926. The number of revenue passengers carried during the year was 19,542,920, an increase of 209,612 over 1925. Local business conditions, in so far as they affected street car riding, were not materially different from those in the preceding year. It was brought out that these increases were attributable largely to the operation, beginning on June 13, 1926, of 27 new type "one-man" cars on three of the principal car lines.

The decrease in operating expenses effected by the use of these 27 new cars could not be shown definitely. The general effect, however, was reflected in the total operating expenses, which, from Jan. 1 to May 31, the five-month period immediately preceding their installation, decreased $8,465 compared with the corresponding period in 1925, whereas for the five-month period from July 1 to Nov. 30, immediately following the installation of the new cars, the decrease was much greater, or $45,170 compared with the corresponding period in 1925. It was fair to assume then, according to General Manager DeLamarter, that more substantial gains in both gross and net would have been made if the new cars had been in continuous service throughout the year.

COMPARATIVE STATEMENT OF INCOME AND EXPENSES OF THE GRAND RAPIDS RAILWAY

Gross Earnings:	1926	1925
Passenger revenue	$1,724,395	$1,697,310
Revenue from special cars	3,480	4,273
Rent of equipment and tracks	38,035	23,994
Non-operating revenue	10,847	13,200
Total	$1,776,758	$1,738,779
Operating expenses and taxes:		
Operating expenses	1,108,709	1,172,157
Taxes	146,287	144,122
Total	$1,254,996	$1,316,279
Gross income available for fixed charges, retirements and dividends	521,761	422,499
Interest on funded debt	261,515	268,248
Interest on unfunded debt	56,609	36,755
Amortization of debt discount	18,577	19,072
Provision for retirements	175,129	165,963
Total interest, other fixed charges and retirements	$511,832	$490,038
Net income	$9,929	*$67,541
Ratio of operating expenses to gross earnings	62.40	67.41
Ratio of operating expenses and taxes to gross earnings	70.63	75.70

*Deficit.

The rates of fare in effect during 1926 were the same as those in effect during 1925, namely, 10 cents individual cash fare and six tickets for 50 cents. Under these rates the company was entitled, according to the terms of its service-at-cost franchise, to earn a return of 7¾ per cent on the value of its property after the deduction of operating expenses, taxes and an amount equal to 3 per cent of the value of the property for retirement reserve. The company's earnings in 1926 available for such return were $105,777 less than those allowed by the franchise.

On the subject of buses the report states that the company operated six passenger buses on five different routes in various sections of the city. One of these routes operated from an outlying district to the business section. The other routes were operated to extend the service of the present railway lines and to transfer their passengers to and from the street cars at intersecting point on the car line. The operation by buses was approximately the same as during 1925, and it is the intention of the management to change or extend bus service to the other parts of the city, when, and as, such service can be justified.

No public financing was done by the company during the year. The cost of the various additions and improvements to the property was provided for partly from earnings, partly from retirement reserve and $159,892 from the unexpended balance of insurance money referred to in the 1925 annual report. The purchase of the new rail coaches was arranged for on a satisfactory basis. Approximately 40 per cent of the purchase price has been paid and the balance is due in convenient monthly payments up to May 26, 1929. During the year the company's bonded indebtedness was further reduced through the retirement by sinking fund of $128,000 first mortgage 7 per cent bonds. This resulted in a total reduction of $223,000 since the bonds were issued in May, 1924.

The additions and improvements referred to aggregated $533,435. Of this amount approximately $370,000 was for the 27 new light-weight, double-truck cars referred to, the remodeling of seven two-man cars for one-man operation and the remainder for track and roadway.

The use of loading platforms and safety zones in the downtown districts was continued throughout 1926 and was helpful in giving the public efficient and safe transportation service. The degree of safety to the public with which service has been rendered in Grand Rapids was indicated by the company's low expenditure for public injuries and damages, it being only 1.32 per cent of the transportation revenue in 1926 and 1.70 per cent in 1925.

Effective June 1, 1926, the company adopted the group life insurance plan for the benefit of its employees and families. Under this plan all employees who are in the service of the company for a year or more receive as a gift life insurance and total and permanent disability protection under a policy issued by the Equitable Life Assurance Society. A feature of the plan is that policies are issued to employees without their undergoing any physical examination, and no employee is excluded on account of advanced age, impaired health or nature of occupation. As of Dec. 31, 1926, a total of 389 employees had received certificates representing a total insurance of $464,100.

Reporting on general conditions, Mr. DeLamarter said that recent surveys in representative cities showed that, compared to motor vehicles, the electric cars carried from 75 per cent to 80 per cent of the riding public in and out of the business centers, and that they occupy only from 10 per cent to 15 per cent of the occupied street areas.

Much space is given in the report to the history of the new electric rail coaches, with copies of testimonials from Grand Rapids residents and letters from automobile dealers praising this type of equipment. Pictures are included showing the new coaches in service.

Receivers Make Favorable Report on Oklahoma Properties

The Oklahoma Railway, Oklahoma City, Okla., during the first eleven months of 1926 carried 13,013,299 revenue passengers, according to W. C. Jones, auditor of the company. This is an increase of nearly 2,000,000 over a similar period of 1925. G. A. Henshaw and G. T. Lackey, joint receivers of the company, attribute a great part of the increase to the many improvements made in the service of the company on its city and interurban lines. They state that a 35 per cent increase was made in railway service and twenty buses were put in operation on five lines. The buses have materially increased the company's profit according to the receivers. Other factors which have contributed to improvement of the financial condition of the railway, according to the receivers, are the increasing seriousness of the parking problem and the enormous advantage of the street car over the automobile from the cost standpoint.

Rhode Island Merger Approved

Stockholders of the New England Power Association approved the purchase of the entire issue of class B stock of the Rhode Island Public Service Company, Providence, R. I., at a special meeting held recently. The Rhode Island Public Service was recently formed to acquire control of the Narragansett Electric Lighting Company, which does the electric and gas business, and the United Electric Railways, which operates the traction lines and buses in the city of Providence.

A statement issued by the New England Power Association says that more than 95 per cent of the United Electric Railways stock and Narragansett Electric Lighting Company stock is available for carrying out the plan and agreement of July 28, 1926, subject to the right of withdrawal. To enable the merger to become effective, a modification to the plan and agreement has been announced permitting the issue of collateral bonds in lieu of the first mortgage bonds originally contemplated. Under the plan, the railway's stockholders have until Jan. 28 to withdraw their shares.

By reason of the facilities enjoyed by the New England Power Association a reduction in lighting rates will be made on or before the close of the present year.

Stockholders also voted to increase the number of directors to enable representation of Rhode Island interests on the board.

End of Public Control of Eastern Massachusetts Near

It is a matter of comment that while there is a great deal of commotion in Boston over the future of the Boston Elevated Railway, Boston, Mass., nothing has apparently been done by anybody to take care of the Eastern Massachusetts Street Railway when the public control of that road terminates two years hence.

The difference in status between the Elevated and the Eastern Massachusetts is that in the case of the Elevated the public control continues automatically at the end of the ten-year period unless the Legislature takes specific action to terminate it. On the other hand, in the case of the Eastern Massachusetts Street Railway the public control terminates automatically unless the Legislature takes measures to continue it.

Unless something is done very soon the public control of the Eastern Massachusetts will end on Jan. 1, 1929, and the property will go back to the stockholders. The public trustees who are now operating the road do not want to take any action, lest it be interpreted as a move to influence their own terms of office. The directors and stockholders have not asked for any new legislation.

A controversy has developed between the trustees and the directors over the bus service policy. The directors say that the trustees have gone too far in allowing the New York, New Haven & Hartford to operate buses in the field which is served by the Eastern Massachusetts, and a movement has been started among the stockholders to organize an independent bus service in competition with the New Haven Railroad buses for the purpose of protecting the property of the Eastern Massachusetts. At the end of the public control period on Jan. 1, 1929, the bus lines and property would be turned over to the Eastern Massachusetts without any profit to the interests organizing these bus lines. The stockholders who are interested in this move have engaged Henry H. Hurlburt as counsel.

Initial Dividend by Philadelphia & Western Railroad

The Philadelphia & Western Railway Company, Philadelphia, Pa., on Jan. 25 declared an initial dividend of 50 cents on the common stock, payable on Feb. 15 to shareholders of record Feb. 5. The company operates out of Philadelphia from a connection with the Philadelphia Rapid Transit Company at the 69th Street Terminal to Strafford and from Villa Nova to Norristown. The system comprises 38 miles of track.

Liquidating the Chautauqua Traction Company

The property of the Chautauqua Traction Company, Jamestown, N. Y., is being dismantled and the net proceeds from the sale of the equipment will be used to retire the bonds, which are in default. The company's first mortgage 5 per cent gold bonds due on April 1, 1934, are almost entirely held by members of the Broadhead family or affiliated interests. Members of this Broadhead family are the sole stockholders of the Chautauqua Traction Company and are the sole owners of affiliated traction lines. Owing to the manner in which these bonds are held there has been no foreclosure, as it was desired to liquidate in the least expensive manner possible.

$18,199,200 of B.-M.T. Bonds on Sale

Offering of $18,199,200 par value of 6 per cent sinking fund gold bonds, series A, due on July 1, 1968, of the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., is to be made by the War Finance Corporation it was announced on Jan. 13 by Secretary of the Treasury Mellon, who is chairman of the latter corporation, which has been ordered to wind up it affairs.

These bonds are part of an authorized Brooklyn-Manhattan Transit issue of $250,000,000 dated July 2, 1923, of which $92,543,500 is outstanding. The War Finance Corporation's holdings represent a loan made to the old Brooklyn Rapid Transit Company in the war period to enable the company to carry on subway work then in progress, which the government had approved as "necessary private construction." The raising of all private capital had been prohibited in order to give the full market to the Liberty Loans, and the only way in which the Rapid Transit company could raise the funds was through a loan from the War Finance Corporation. It had a note issue of about $60,000,000 coming due and the War Finance Corporation agreed to advance 30 per cent of the funds, the note holders accepting an extension covering the remaining 70 per cent.

The bonds now being offered are in coupon form. They consist of 18,999 bonds of a par value of $1,000 each and two of $100 each. The Federal Reserve Bank of New York holds them as custodian and fiscal agent of the War Finance Corporation. The price is 99½ and interest.

Dividend Cut by Brooklyn City Railroad

The Brooklyn City Railroad, Brooklyn, N. Y., on Jan. 25 declared a quarterly dividend of 10 cents on the capital stock. Previously 20 cents was paid quarterly. In explaining the reduction the company issued the following statement:

> The Brooklyn City Railroad and the B.-M. T. have applied to the Board of Estimate for franchises to operate buses in Brooklyn. In view of the large investments the Brooklyn City Railroad may be confronted with in this connection the directors deem it advisable to pursue a more conservative policy as to dividends at this time.

The company has only one class of stock outstanding. It is of a par value of $10 a share.

Last Step Effected in New Haven Control

The Public Utilities Commission of Massachusetts has approved the acquisition of stock of the New England Investment & Security Company by the New York, New Haven & Hartford as the final chapter in the return of the control of the Springfield Street Railway, Springfield, and the Worcester Consolidated Street Railway, Worcester, to the New York, New Haven & Hartford Railroad. The commission approves the acquisition of $300,000 first mortgage bonds of the Springfield Street Railway; authorizes the issue of shares of preferred stock of the New England Investment & Security Company and authorizes the acquisition of outstanding shares of common stock of the New England company.

Financial Situation on Boston Property Revealed

The application of Franklin T. Miller, receiver of the Boston & Worcester Street Railway, Boston, Mass., to issue receiver's certificates for $100,000 to finance continued operation has been denied. The receiver has now applied to the court for authority temporarily to suspend all electric railway service, with permission, however, to resume operation between Boston and Wellesley Hills and possibly South Framingham as soon as arrangements for electric power can be made. If buses are continued and cars are operated only between Boston and Wellesley a monthly profit of $3,400 is indicated. If buses are operated to the exclusion of the railway it is figured by the receiver there would be a monthly gain of about $6,700. Since Feb. 11, 1925, when Mr. Miller assumed the duties of receiver, to Nov. 30, 1926, total losses were $57,924. The financial situation of the company was made plain in Mr. Miller's seventh report filed in the Supreme Court wherein he asked authority to issue receiver's certificates.

In connection with Receiver Miller's petition Roland W. Boyden, appearing for the American Trust Company, trustee for the $2,500,000 of the bonds, said that the loss was not so great as it might seem. He said that a committee of bondholders was trying to complete arrangements to continue the company. He complimented Mr. Miller on his work as a receiver. One of Mr. Boyden's suggestions was that Mr. Miller be allowed to issue certificates of indebtedness, but the court declined to sanction this.

Mayor Temple of Marlboro and officials of the towns of Framingham, Shrewsbury and Hopkinton opposed the proposed substitution of buses for electric cars. They said the bus service would not be adequate for the factory employees.

After the hearing Judge Carroll said it was a serious matter for the court to take the responsibility of continuing a public service corporation which is being run at a loss, and he suggested to certain lawyers interested in the affairs of the railway that they try to devise a plan for the operation of the road. If they cannot agree about the matter in the course of a month the court may grant permission to abandon the service.

Chicago South Side Surface Lines to Pay Interest

A statement indicating that the south side surface lines at Chicago may seek their way out of the present traction difficulty without a receivership has been addressed to bondholders of the companies by Leonard A. Busby, president. The interest on the $33,926,000 bonds of the Chicago City Railway and the Calumet & South Chicago Railway, which matures on Feb. 1, will be paid promptly, but the principal will be defaulted, the statement said. It added that the interest will continue to be paid until the city and the companies reach an agreement and new bonds are issued for the present liens.

A. L. Drum Made Detroit United Receiver

W. C. Dunbar and the Security Trust Company, Detroit, Mich., have resigned as receivers of the Detroit United Railway, and A. L. Drum, who has been acting as executive manager, has been appointed receiver by the federal court. Mr. Drum's appointment combines the duties of operation and reorganization under one head.

The plan of reorganization worked out by the former receivers proved impracticable. It has been abandoned. According to the former receivers, the working out of the facts and circumstances bearing on the rights and relationship of parties at interest has been largely accomplished, though for the most part not yet adjudicated. The executory contracts existing at the time of the receivership have been either rejected or adjusted and put upon a permanent basis. The primary function of the receivership for some time to come will be the operation of the railway.

The receivers are, therefore, of the view that under such conditions the expense of conducting such receivership ought to be minimized by cutting off so far as practicable all expenses other than for operation. That is their reasons for tendering their resignations.

Traffic on the Increase.—Reports of the Illinois Power & Light Corporation for the first eleven months of 1926 in Decatur, Ill., show gains in numbers of both street car and bus passengers. The buses carried 2,827,000 passengers during the period and the cars 5,569,000 passengers. Ten buses and 22 cars were in service and buses averaged 5.4 miles to the gallon, while the tire mileage was between 21,000 and 22,000.

Traffic Gains.—The lines of the Chicago & Joliet Electric Railway carried nearly 7,000,000 people in Joliet, Ill., last year and the interurban system, the Illinois Traction, carried 2,500,000. The totals exceeded any year since 1920 and indicated steady increase throughout the year with a sharp upturn in the last weeks of the year. Freight gains were marked, too, and from this source the traction officials reported a slight increase in the net earnings of the company for the year.

Railway Issues Increase.—The California Railroad Commission during the twelve months ended Dec. 31, 1926, authorized the issue of $158,012,522 of stock, bonds, notes and other evidences of indebtedness. Of this amount $5,700,000 was issued by electric railways. In 1925 the total amount was $132,037,049, of which the electric railways issued $3,610,461.

Does Big Holiday Job.—The Public Service Railway, Newark, N. J., played an important part in the great holiday trade done during the week preceding Christmas, 1926. Its cars and buses made it possible for more shoppers to get to and from the stores than in any previous holiday season in the history of the company. In commenting on this situation M. R. Boylan, who directs operation, said that for the six business days immediately preceding Christmas the company transported 11,945,380 passengers, or an average of 1,990,896. He said that this figure was nearly 300,000 riders a day in excess of the normal average. The heaviest day's riding was the Saturday before Christmas, which condition, he believed, showed that the "do your shopping early" idea was beginning to take hold.

Traffic on the Increase in Madison.—A gain of 64,737 railway and bus passengers was made by the Madison Railways, Madison, Wis., in December, 1926, over the corresponding month of 1925, when 605,864 patrons were carried. Of the 670,601 passengers carried during the last month of 1926, 609,643 used the street cars. Gross railway and coach revenues for December, 1926, were $45,545, against $41,108 in December, 1925. Gross railway revenue for December, 1926, was $41,025, compared with $38,212 for December, 1925.

Personal Items

J. A. Ritchie and P. W. Seiler in New Posts with Yellow Coach

John Hertz, chairman of the board of directors of the Yellow Truck & Coach Manufacturing Company, Chicago, Ill., announced on Jan. 22 important changes in the personnel of that company. John A. Ritchie has been made vice-chairman of the board of directors and Paul W. Seiler has been elected president and general manager.

Mr. Hertz said that the change was made in order to enable Mr. Ritchie to devote more time to the sales end of the coach business, because of the general nation-wide demand for coach service at this time. Mr. Ritchie is president of the Chicago Motor Coach Company and chairman of the board of directors of the Fifth Avenue Coach Company, New York. He will continue in these capacities. Mr. Hertz said:

P. W. Seiler

> Mr. Ritchie will serve as vice-chairman of the board of directors. This will enable him to share with me some of the work that I have been giving personal attention.

Mr. Seiler, the new president and general manager, is one of the youngest chief executives in the General Motors fold. He has been president and general manager of the Ternstedt Manufacturing Company, a subsidiary of Fisher Body Corporation, the largest manufacturer of automobile body hardware in the world.

Changes in United Light & Power Company Announced

Important changes in the personnel and promotions in the officers' ranks of the United Light & Power Company, with main office in Chicago, Ill., will occur on Feb. 1. Only slightly is the railway department affected by these changes.

T. C. Roderick, who has been general manager of the Tri-City Railway of Illinois, stationed at Rock Island, Ill., will leave the railway division and enter the gas division as general manager of the Ottumwa Gas Company, succeeding Mr. Wuestenfeld. Mr. Roderick went to the United Light several years ago from the Grand Rapids Railway.

R. J. Smith, who has been manager of the Tri-City Railway of Iowa, also becomes general manager of the Tri-City Railway of Illinois. Both the Iowa and Illinois traction lines of the Tri-Cities and the Clinton, Davenport & Muscatine Interurban Railway will be under his charge. He succeeds to the responsibilities that formerly were Mr. Roderick's.

F. A. Nolan Assistant to Detroit Municipal Manager

Fred A. Nolan, who has been connected with the Department of Street Railways at Detroit, Mich., since its inception, has been named assistant to the general manager by the Street Railway Commission. The commission's action was taken upon the recommendation of Del A. Smith, acting general manager, to fill the vacancy caused by the appointment of Frank J. Denny, formerly assistant to the general manager, to the position of director of publicity. Mr. Nolan was formerly an assistant auditor for the municipal railway.

Jurisdiction of Officers of Atlanta Company Widened

F. L. Butler, vice-president and manager of the railway department of the Georgia Railway & Power Company, Atlanta, Ga., will have general charge and supervision of the operation, maintenance and construction of the railway properties of the Athens Railway & Electric Company and the Rome Railway & Light Company.

W. P. Hammond, assistant chief engineer of the Georgia Railway & Power Company, has been placed in general charge and supervision of all electrical engineering and construction outside the seven-mile zone for the Georgia Railway & Power Company, Atlanta; Athens Railway & Electric Company, Georgia - Southern Power Company, Rome Railway & Light Company, the Georgia Utilities Company and Mutual Light & Water Company.

C. E. Bennett, manager of the electrical department of the Georgia Railway & Power Company, has been placed in general charge of all electrical operation, maintenance, engineering and construction within the seven-mile zone. He will also have general charge and supervision of all operation and maintenance of the electric transmission and distribution system of the Georgia Railway & Power Company outside the seven-mile zone, and in addition the electric transmission and distribution systems of the Athens Railway & Electric Company and other utilities in the group.

C. A. Collier, general sales manager of the Georgia Railway & Power Company, has been placed in charge of all sales activities of the Athens Railway & Electric Company, the Athens Gas, Light & Fuel Company, the Georgia-Southern Power Company, the Rome Railway & Light Company, the Georgia Utilities Company and the Mutual Light & Water Company.

These changes are all apparently made in consonance with the deal under which the Georgia Power Company, acting for the Southeastern Power & Light Company, has acquired the Georgia Railway & Power Company, the Athens Railway & Electric Company, the Rome Railway & Light Company, the East Georgia Power Company and other properties.

Clarence E. Mitten Goes to Buffalo

Clarence E. Mitten has been appointed passenger traffic manager of the International Railway, Buffalo, N. Y. He will handle both electric and bus transportation and will report direct to President Yungbluth. Mr. Mitten's appointment was announced by President Yungbluth.

C. E. Mitten

Mr. Mitten goes to the International Railway organization from the Chicago & Eastern Illinois Railroad, where he has had twenty years' experience. His latest position in that organization was assistant superintendent of transportation. The new passenger traffic manager will make his headquarters in Buffalo.

P. H. Gadsden Nominated for Chamber of Commerce

Philip H. Gadsden, a vice-president of the United Gas Improvement Company, Philadelphia, and former president of the American Electric Railway Association, has again been nominated for election as a director of the United States Chamber of Commerce. Mr. Gadsden is a candidate to represent the second election district on the board. For some years Mr. Gadsden has been prominently identified with the national chamber, having been elected as a director in 1920. In addition, he became a director of the Philadelphia Chamber of Commerce in that same year, subsequently being elected vice-president, and early last year president. He has also served as a director of the Pennsylvania State Chamber of Commerce.

During the war Mr. Gadsden served as chairman of the National Committee on Public Utility Conditions, representing the interests of the electric railway and gas companies in connection with their war problems. A native of South Carolina and a lawyer by profession, Mr. Gadsden retired from the active practice of law to manage and direct local public utilities. It was in 1918 that he was elected to a vice-presidency in the United Gas Improvement Company in charge of its department of public relations.

W. J. Harvie with Albany Company

William J. Harvie, formerly general manager of the Auburn & Syracuse Electric Railroad, Syracuse, N. Y., has been made assistant general manager of the United Traction Company, Albany, N. Y., and its associated electric railway properties. Mr. Harvie's duties in this position will have to do particularly with the supervision of matters relating to safety, claims and the personnel. Beginning Jan. 1, 1927, the United Traction Company resumed its direct liability for claims, which for some years past had been covered by an accident insurance policy, and decided to place primary responsibility for the reduction of accidents and its allied problems, such as personnel and the engagement of platform men, directly upon one official. This decision accounted largely for the appointment of Mr. Harvie, whose extended experience in railway operation well fits him for this work.

Pierre Mariage a Visitor to United States

Pierre Mariage, who is associated with the Paris street railway and omnibus system and is manager of its allied car building company, la Société de Construction et d'Entrétien de Matériel Industrial et Agricole, has been spending a few weeks in this country inspecting electric railway and bus systems. Mr. Mariage was one of the official delegates from France attending the third World Motor Transport Congress held in New York Jan. 10 to 12. Later he visited various American cities, including Chicago, Detroit, Philadelphia, and Newark, N. J., studying car and bus design and operation. He sailed for Paris on Jan. 29. Mr. Mariage is the son of A. Mariage, chairman of the board of the Société des Transports en Commun de la Région Parisienne, which operates all of the tram lines and bus lines in Paris.

Henry W. Smith has been appointed general passenger and freight agent of the Chicago, South Bend & Northern Indiana Railway and Southern Michigan Railway, both of South Bend, Ind. He succeeds in this capacity the late John S. Moore. Following his graduation from Hanover College Mr. Smith spent a year and a half with the Snell Manufacturing Company, but left that concern to accept an appointment with the Chicago, South Bend & Northern Indiana Railway in 1910. During that time he secured a broad experience in the electric railway freight and passenger business, as he started in the freight department and worked his way up to the position of assistant auditor. The latter position he has held continuously since 1918.

OBITUARY

Anson W. Burchard

Vice-Chairman of Board of the General Electric Company Succumbs in New York at the Age of 61—Constructive Force in Industry—Sketch of His Business Career

ANSON WOOD BURCHARD, vice-chairman of the board of directors and chairman of the executive committee of the General Electric Company and chairman of the board of directors of the International General Electric Company, died on Saturday afternoon, Jan. 22, of acute indigestion, at the home in New York City of Mortimer L. Schiff, with whom he was lunching.

A. W. Burchard

Mr. Burchard was regarded by his associates as a man with a superior degree of executive ability. His contributions to industry progress, particularly progress in the light and power field, were great and lasting. His activities in welding together corporations and manufacturing organizations made the work of standardization and simplification that much easier, and from it therefore not only the electrical industry but the purchasers of electric lamps and apparatus derived advantage. Toward the establishment of an ideal business and manufacturing enterprise in which the seller and buyer both gain Mr. Burchard's contributions were priceless. He was especially skilled as an organizer, and his abilities were recognized abroad as well as at home. In the domain of corporate finance he was most versatile, and he was better known in the offices of the holding companies and large corporations than among the rank and file of utility operators. His counsel was sought by numerous interests outside the immediate sphere of his activity.

Men associated with Mr. Burchard in business and others who had come to know him, even those whose contacts with him were not so close as were those of his fellow officers, all were unstinted in their praise of Mr. Burchard as a man and of him as a constructive force in industry.

In co-operation with the late Charles A. Coffin, founder of the General Electric Company, he laid out a policy of development of the financial resources of electric public utilities, enabling them to arrange credits and buy more easily, and thereby stimulated the expansion of the industry. He was also active twenty years ago in the consolidation of the many manufacturing units of the General Electric Company, such as the Stanley Electric Company, the Fort Wayne Electric Company, the General Incandescent Arc Lighting Company, the Northern Electric Company and the Sprague Electric Company.

Mr. Burchard was born at Hoosick Falls, N. Y., on April 21, 1865. After graduation from the high school there, he entered Stevens Institute of Technology, where he was graduated in 1885 with the degree of mechanical engineer. He entered business with the J. M. Ives Company, a steam and general factory engineering firm at Danbury, Conn. In 1891 he became treasurer and manager of the T. & B. Tool Company of Danbury, where he remained until 1900, when he became vice-president of the Cananea Consolidated Copper Company, operating mines at Cananea, in the State of Sonora, Mexico.

WITH THE GENERAL ELECTRIC COMPANY NEARLY TWENTY-FIVE YEARS

After filling this post for two years, Mr. Burchard in 1902 joined the General Electric Company. Until 1904 he was comptroller, with headquarters at Schenectady. In that year he was named assistant to the president, in 1912 he was elected vice-president, and in 1917 he was made a member of the board of directors. In May, 1922, he was elected vice-chairman of the board, and in June of the same year he was elected president and chairman of the board of directors of the International General Electric Company. About a year ago he was relieved of the duties of president but continued as chairman of the board. During the war he acted as assistant to Benedict Crowell, director of munitions.

Mr. Burchard was a director of several utility and electrical companies and a member of many electrical and power clubs and organizations including the A.I.E.E. and the A.S.M.E.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

South Shore Starts Big Improvement Program

An extensive equipment and building program has recently been undertaken by the Chicago, South Shore & South Bend Railroad. Twenty new passenger cars have been ordered by the company from the Pullman Car & Manufacturing Corporation. Ten will be equipped as motor cars and the rest will be used as trailers. In addition plans were announced for a new two-story passenger station at Michigan City, Ind., to be used jointly by the Chicago, South Shore & South Bend Railroad and the Shore Line Motor Coach Company.

The new cars will be equipped with bucket type seats, upholstered in gray mohair velvet, both automatic electric and circulating hot water systems, walnut finish interior woodwork, electric fans, battleship linoleum flooring, dome lighting, adequate toilet facilities and an inclosed smoking compartment similar to those in Pullman cars. Motor and other electrical and mechanical equipment will be the same as on the cars now in use. Two dining cars and two parlor observation cars will be placed in service in February, and with the delivery of the new cars in the early summer will bring the total cost of passenger equipment placed in service since the present management began operation, to $2,069,000.

The cars will be 1 ft. longer than the present equipment and will have vestibules, with diaphragms between cars providing protection for passengers passing through the train.

Cost of the passenger station is estimated at approximately $200,000, and construction work, it is said, will be begun at once. The Michigan City station is an important transfer point, as motor coach passengers traveling between Chicago and western Michigan have the option of riding between Chicago and Michigan City on the first electric train of the South Shore line, thus saving at least an hour of travel.

A site for the improvement has been secured across the street from the present South Shore station, where a large parking and loading space for motor coaches will be provided directly north of the structure.

The rapid growth in passenger traffic, and the even greater increase indicated for the coming months, makes the purchase of the additional equipment necessary according to Charles H. Jones, general manager.

"On several occasions," Mr. Jones states, "during the fall and winter, when travel has been exceptionally heavy, nearly every car owned by the company has been placed in service for the traffic. This is a very good demonstration of the popularity of our service in the growing territory served.

"Basing our judgment of the future on this past popularity, the new equipment is being purchased in order that South Shore Line service will remain on a plane of equality with that of any other railroad in the country."

Market Street Railways Places Large Order for Seats

Market Street Railway, San Francisco, Cal., recently set in motion its 1927 improvement program by placing an order for 1,278 spring cushion seats with Hale & Kilburn of Philadelphia. Of the lot, 730 covered with genuine green leather are to be installed in the inclosed sections of 73 cars. The remaining 548 seats of the cane-covered type will be used in open car sections. Announcement also has been made that the 37 cars now in service will be rehabilitated, which with the cost of the new seats, estimated at $35,000, will bring expenditures for 1927 up to $53,000. When finished, the cars are to serve the Mission and Sunset districts.

50 De Luxe Cars Ordered by Eastern Massachusetts Railway

Eastern Massachusetts Street Railway has authorized the remodeling of 50 cars along lines similar to the de luxe cars now operating on its suburban routes. Orders also have been placed for 50 additional, double-truck light-weight de luxe cars to be delivered early this year. These cars will be provided with de luxe seats and Pullman type of rubber floor covering. This will have an interior finish of genuine mahogany and are to be lighted with five Pullman type dome fixtures, each fixture containing a 94-watt compensated lamp. When delivered, the company will have 100 cars of the de luxe type, which it is understood will take care of the larger portion of the so-called suburban service and will replace 50 of the old style, heavy double-truck type.

General Electric Saves Customers $12,000,000

General Electric Company for the year ending Dec. 31, 1926, reports orders totaling $327,400,207, an increase of 8 per cent, or nearly $25,000,000 over 1925. President Gerard Swope states that this is the biggest volume of orders in the company's history, the previous high mark, achieved in 1920, being $318,470,000, or about $10,000,000 below the new record. "On the basis of the 1926 volume of sales, price reductions during the year have resulted in an annual saving to the company's customers of upward of $12,000,000," said Mr. Swope. "This is a result of improved design, better methods of manufacture, numerous suggestions from the workmen which have reduced costs, reflected in lower selling prices to customers."

United Traction Company Orders Twenty Mack Buses

United Traction Company of Albany, N. Y., has just ordered twenty new Mack six-cylinder gas-electric buses of the 29 passenger standard city type. The new equipment will have General Electric generators, model DT-1115, 190-volt, 200-amp., 1,140 r.p.m. and the motors will be GE single 115-120-volt, 240-amp., 1,880 r.p.m. These buses will be operated by the Capital District Transportation Company, a subsidiary of the United Traction Company.

St. Louis, Troy & Eastern Lets $1,000,000 Bridge Contract

General contract for the construction of a 7,400-ft. elevated steel and trestle railroad approach to the McKinley Bridge at Venice, Ill., was awarded recently to the Fruin-Colmon Contracting Company of St. Louis by the Illinois Power & Light Corporation, for its subsidiary company, the St. Louis, Troy & Eastern Railroad. The project will cost approximately one million dollars, and will enable the St. Louis, Troy & Eastern to avoid numerous grade crossings with other railroads in Madison and Venice, Ill. When the McKinley Bridge was constructed provision was made for the installation of such an elevated approach from the Illinois side, and this approach will be used for limited passenger and freight traffic by the Illinois Traction system. Construction work will start in the early spring.

$400,000 Plant for Georgia Railway & Power Company

Georgia Railway & Power Company, Atlanta, Ga., will start work early in February on its Cherokee storage plant which will include carhouses, shop buildings, a welding plant, a storehouse, and an athletic field for employees. An appropriation of $400,000 has been set aside for this work, exclusive of the cost of the land. A 41-acre tract on the Atlanta-West Point line between Green Street and South Boulevard has been chosen as the site of the new project, said to be one of the largest undertaken by a Southern utility.

Ten Modern Cars Ordered by Gary Railways

An order for nine new light-weight, one-man, double-truck safety cars for service on city lines in Gary and an additional interurban car for the Hammond division was placed on Jan. 22 by the Gary Railways. The new cars will be built by the Cummings Car & Coach Company at Paris, Ill., at an estimated cost of $166,000.

Specifications for the city type equipment call for an attractive streamline car weighing only 36,000 lb., equipped with four 35-hp. General Electric motors, deep-spring plush seats, pneumatic sliding doors and rear exit treadles, and capable of seating 56 passengers. The single new 46-passenger interurban will be similar in dimension and weight to the seven modern safety cars placed in twenty-minute service early this month between Gary and Hammond. Material savings in power, maintenance and platform expense are anticipated from the operation of both types of rolling stock.

Twelve New One-Man Cars Added to Scranton Railway

New Equipment Puts Fitkin Interests One Step Nearer the Goal of One-Man Operation—Management Sees Bright Outlook for 1927—Business Normal After Revenue Decrease During 1925 Strike

DELIVERY of twelve new interurban cars to the Scranton Railway during December marks another step toward 100 per cent one-man operation on this important property of the Fitkin interests.

The new rolling stock, which is of the one-man, two-man type, was built by the Osgood-Bradley Company, which late in 1925 made delivery of a number of cars of a somewhat similar design to the Scranton Railway, Altoona & Logan Valley Electric Railway and Youngstown & Suburban Railway. Details of these units were covered in ELECTRIC RAILWAY JOURNAL of Aug. 14, 1925, at which time it was announced that they had replaced single-truck wooden cars and double-truck heavy units.

In over-all length, height and width the units delivered last month are slightly different from standards set by the A.E.R.A., and there is also provision for seating four more passengers than have been specified by the association for this type of car. The bodies are of semi-steel construction with arch type roofs, the interior trim being of mahogany. The power equipment consists of four Westinghouse 510A motors. The units are for city service. Complete specifications of the car are as follows:

Seating capacity	44
Weight:	
Body equipped	20,000 lb.
Trucks with motors	15,800 lb.
Total	35,800 lb.
Bolster centers, length	21 ft. 4½ in.
Length over all	41 ft. 10 in.
Truck wheelbase	5 ft. 6 in.
Width over all	8 ft. 5 in.
Height rail to trolley base	11 ft. 1½ in.

Typical Interior of the Twelve Cars Recently Delivered to the Scranton Railways by the Osgood-Bradley Car Company for City Service

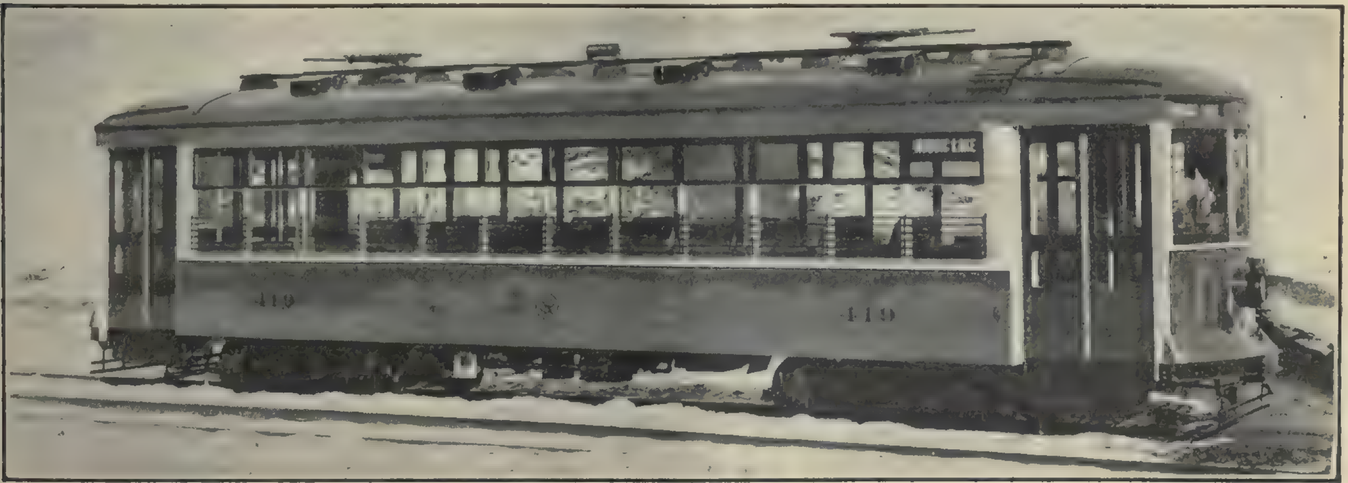
Body	Semi-steel
Interior trim	Mahogany
Headlining	Agasote
Roof	Arch
Air brakes	Westinghouse Traction Brake Co.
Armature bearings	Plain
Axles	A.E.R.A. standard E-2
Bumpers	Osgood-Bradley standard
Car signal system	Faraday
Car trimmings	J. L. Howard & Co.
Center and side bearings	Osgood-Bradley
Compressors	Westinghouse DH-16
Conduit and Junction boxes	Osgood-Bradley
Control	Westinghouse K-35
Couplers	Osgood-Bradley
Curtain fixtures	Morton Mfg. Co.
Curtain material	Pantasote
Destination signs	Hunter
Door operating mechanism	National Pneumatic
Fare boxes	Cleveland
Fenders	Root
Finish	Pratt & Lambert enamel
Gears and pinions	Tool Steel Gear & Pinion Company
Hand brakes	Peacock staffless
Heater equipment	Consolidated
Headlights	Ohio Brass Gold Ray
Journal bearings	A.E.R.A. type 3½ in. x 6 in.
Journal boxes	Symington
Lightning arrester	Aluminum cell
Motors	Four Westinghouse 510-A, inside hung
Safety devices	Safety Car Devices Co.
Sanders	Osgood-Bradley
Sash fixtures	O. M. Edwards Co.
Seats	Heywood-Wakefield Co.
Seating material	Leather
Slack adjuster	Osgood-Bradley
Springs	Fort Pitt and Railway Steel Spring Co.
Step treads	Kass
Trolley catchers	Earll
Trolley bases	Ohio Brass
Trolley wheels	Jones
Trucks	Osgood-Bradley OBC-48-66-G
Ventilators	Garland C-1 Jr.
Wheels	Steel Car Forge, 26 in. dia.

Although too early to compile figures showing savings in operation effected by these cars, officials of the Fitkin management have some interesting data on which to back their faith in one-man operation.

NEW CARS PRODUCE $198,000 ADDED REVENUE

In connection with the cars purchased in 1925, some of which were put in service on the Greenridge, Peoples and Dunmore suburban lines, there was an expense decrease and an operating revenue increase, resulting in an annual revenue increase of $198,000 as of Nov. 1, 1926. Incidentally, the operation of the cars of the new type have shown 13 per cent increase in passengers carried as of April, 1926, based on a mileage of 150 miles a day and an eighteen-hour operation.

According to officials of the company, the coal strike of 1925 afforded some valuable tests in the way of proving the efficiency of one-man operation. When the strike commenced, in Sept. 1, 1925, steps were taken to cut operating expenses, which resulted in the immediate rehabilitation of rolling stock to the one-man car design, these cars being equipped with all safety appliances. With the new cars operating 500,000 hours during the period from Sept. 1, 1925, to Feb. 1, 1926, when the strike was terminated, there was a saving of $158,000 in labor and platform expense, the saving in plat-



Exterior of Interurban Cars Recently Built by the Osgood-Bradley Company for the Scranton Railway and Placed in Service Last Month form expense being estimated at approximately 30 cents an hour.

Some idea of the value of this saving may be gained when it is known that for the year ended Aug. 31, 1926, the Scranton Railway, due to the strike and general unrest preceding it, showed a decrease in earnings of nearly 9 per cent as compared with the preceding year. For the specific duration of the strike the decrease was $150,000.

In spite of this the Fitkin interests spent more than $600,000 for new equipment, etc., during 1926, this figure being divided as follows: Equipment, $225,000; track and roadway, $335,000; overhead, $20,000; miscellaneous, $10,000. As mentioned in the JOURNAL for Dec. 18, 1926, the company built ten new car bodies in its own shops last year. Ten additional bodies will be constructed during 1927. Due to a favorable wage agreement recently effected with the miners, the officials see a prosperous year ahead for their properties in the region contingent to the mining district. Figures as to the possible expenditures for equipment and improvements for 1927 are now being compiled and it is understood will be announced in the near future.

Westinghouse's Orders for Last Quarter 1926 Nearly $50,000,000

Orders booked by the Westinghouse Electric & Manufacturing Company in the three months ending Dec. 31, with December orders estimated at $16,390,000, were approximately $49,825,000, it was announced recently. Of this total $16,193,654 represented orders from the electric railway and allied fields. The total order figure as compared with $39,770,000 in the corresponding quarter of the preceding year, shows an advance of more than 26 per cent.

Rolling Stock

Georgia Railway & Power Company, Atlanta, Ga., has assigned safety cars to its River and Soldiers' Home-English Avenue lines, which brings the number of Atlanta lines on which the new cars are in operation to eleven. This means that all of the 100 safety cars bought during the past two years are now in service.

Northern Ohio Power & Light Company, Akron, Ohio, is reconstructing 46 cars of the type known as "600." They will be made into a type similar to the Peter Witt car. At the same time the Peter Witt cars on the property are being equipped with all known safety devices.

Boston Elevated Railway has purchased a Mack gas-electric bus of the standard 29-passenger city type. The bus will make 24 daily trips on the route between Howard Square and Union Square. This is the 88th Mack bus purchased by the company, but the first of the gas-electric type.

Lincoln Traction Company, Lincoln, Neb., has purchased six 25-passenger Mack city type buses for operation on various routes in the city. The new equipment will be placed on routes known locally as Lancaster Agriculture College and University Place.

Metal, Coal and Material Prices

Metals—New York	Jan. 25, 1927
Copper, electrolytic, cents per lb.	13 00
Copper wire, cents per lb.	15.25
Lead, cents per lb.	7.40
Zinc, cents per lb.	6.72
Tin, Straits, cents per lb.	64.875
Bituminous coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$5.325
Somerset mine run, Boston, net tons	2.575
Pittsburgh mine run, Pittsburgh, net tons	1.95
Franklin, Ill., screenings, Chicago, net tons	1.875
Central, Ill., screenings. Chicago, net tons	1.425
Kansas screenings, Kansas City, net tons	2.35
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$5.50
Weatherproof wire base, N.Y., cents per lb.	17.00
Cement, Chicago net prices, without bags	2.10
Linseed oil (5-bbl. lots), N. Y., cents per lb.	11.00
White lead in oil (100-lb. keg), N. Y.. cents per lb.	14.50
Turpentine (bbl. lots), N. Y., per gal.	$0.81

Fageol Company, Kent, Ohio, reports the delivery of four auto buses to the Scranton Railway and six buses to the Department of Street Railways, City of Detroit, between Dec. 1 and 15.

Fageol Motors Company of California delivered fourteen buses to the Key System Transit Company and three buses to the Los Angeles Railway during December, 1926. All were of the six-cylinder street car type.

Tri-City Railway Company of Iowa has purchased a 29-passenger bus from the Mack Corporation for operation on the Fejevary Park and LeClaire Street route.

Track and Line

Philadelphia Rapid Transit Company, Philadelphia, Pa., is requested by Councilmen Daly, Crossan and McKinley to extend its Front Street railway from Tioga Street to Rising Sun Avenue. This will provide better facilities for Fox Chase residents who wish a more direct route to the Frankford Elevated station at Front and York Streets.

Philadelphia Rapid Transit Company, Philadelphia, Pa., will extend the Erie Avenue line to the Frankford elevated system. The work is to be completed and ready for operation in October. This two-track extension on Erie Avenue was approved in 1923.

Shops and Buildings

Georgia Railway & Power Company, Atlanta, Ga., is now constructing a three-unit brick and steel garage, at an estimated cost of $110,000. The new structure, known as the Gilmer Street garage, will consist of a main building 115x250 ft., divided into two sections by a fire wall. Each section will contain approximately 14,000 sq.ft. and can accommodate 35 large coaches when parked parallel to the side of the building, or 45 medium-sized trucks parked at 45 deg. Gasoline and oil service stations, water and air lines and an inspection pit are to be included in the main structure. A 40-ft. square paint shop and a storeroom 24x85 ft. will complete the layout.

Chicago Rapid Transit Company has commenced work on a new $250,000 terminal to be located at Wells and Quincy Streets. It will accommodate a certain portion of the West Side elevated trains and form the Chicago terminal of the Chicago, Aurora & Elgin Railroad. The old station on the same site will be torn down, but train service will be continued during the construction period.

Trade Notes

L. W. Grave, treasurer and general manager of the Cleveland Pneumatic Tool Company, Cleveland, Ohio, announces the merger of his company with the Westinghouse Air Spring Company of New Haven, Conn. The Westinghouse Company was patentee of the first shock absorbing equipment of the air controlled type, and the pneumatic tool concern manufactures and sells the Gruss air spring.

William J. McIntyre has been appointed sales representative for the Chassis Lubricating Company, in the Detroit-Toledo district, with offices at 4-159 General Motors Building.

B. H. Lytle has been appointed manager central sales division of Hyatt Roller Bearing Company, with headquarters at 806 Fulton Building, Pittsburgh, Pa. After being graduated from Carnegie Tech, Mr. Lytle entered the service of the Westinghouse Electric & Manufacturing Company, where he remained until his recent connection with the Hyatt Company. His new position places him in charge of the sales of Hyatt roller bearings for all applications in the central division, except automotive.

Edwin Desuden has joined the sales organization of the National Railway Appliance Company in the capacity of special representative, with headquarters at 452 Lexington Avenue, New York City. Mr. Desuden was for many years sales manager of the Jewett Car Company and later served as manager of the railway department, Chicago Varnish Company.

Root Spring Scraper Company, Kalamazoo, Mich., furnished the scraper equipment for the new Williamsport one-man cars, which were described in the JOURNAL of Jan. 8.

Public Service Transportation Company recently ordered 450 type J Johnson electrically operated automatic fare boxes for buses, which means that the company will soon have 807 buses fully equipped with this apparatus. The type J Johnson fare box registers every fare electrically, instantaneously and audibly, by means of the coin itself which the passenger places in the box. The last order brings the total installation of these boxes in buses and street cars to 2,207.

New Advertising Literature

Alexander Milburn Company is now describing its welding and coupling apparatus in a handy pocket brochure. Among other things the new publication contains price lists on Milburn outfits, regulators, gages, manifolds, etc.

In any type
of service—

"Peacock" Staffless Brakes!

Reg. U. S. Pat. Off.

Regardless of type of equipment—lightweight interurbans,—one man cars—one-man-two-man cars—city cars—interurban cars — articulated cars — de luxe cars — parlor, chair, dining cars, etc.—Peacock Staffless Brakes are found to be an essential part of the equipment.

They have many advantages which adapt them to modern cars—little platform space occupation—three times the braking capacity of ordinary hand brakes—almost unlimited chain winding capacity — twelve feet, if necessary — low installation and maintenance cost,—simplicity of operation, etc.

Get facts and figures of what they have done for others and what they will do for your cars.

The
Peacock
Staffless

National Brake Company, Inc.
890 Ellicott Square Buffalo, N. Y.
Canadian Representative:
Lyman Tube & Supply Co., Ltd., Montreal, Can.

One of the Goodyear-equipped fleet of buses operated by the Yosemite Park and Curry Co.

GOODYEAR

Copyright 1927, by The Goodyear Tire & Rubber Co., Inc.

The new all-weather road to Yosemite

That queen of the national parks—Yosemite—no longer is hidden away a part of the year, but in all seasons now stands forth in the full glory of mountain crown and Bridal Veil falls, giant sequoias, jeweled lakes and bright shawls of wildflowers.

The completion of the all-weather route makes this superb public playground accessible the year around.

And the official public motor travel over this all-weather route—the swift, luxurious touring buses of the Yosemite Park and Curry Co.—is insured dependable, secure and economical tire service at all times by Goodyear Pneumatic Bus Tires.

* * *

During summer months these buses equipped with Goodyear All-Weather Treads penetrate daily the high Sierras beyond Yosemite Valley. Grades reach as high a pitch as 24%, and the cars top an elevation of 10,000 feet.

Dirt road, and some of it hard to negotiate, this is a route that calls for real tires—tires with tractive power, hold-fast and hang-on grip, stout carcasses.

It's the kind of duty that best is served by the Goodyear All-Weather Tread Tire.

President D. B. Tresidder, of the Yosemite Park and Curry Co., reports that already their Goodyear Tires have established their mastery of the Yosemite roads. With all of them delivering a high average mileage much in excess of any previous tire performance, some of them have run as much as 24,000 miles in this exacting duty.

"Our Goodyear Tires," says Mr. Tresidder, "are delivering us the kind of tire service that fits in with our every equipment provision for making this park a genuine all-year public playground. Come out this Winter, and see how easily, safely and pleasantly you can go in a few hours from California's main traveled highways into the heart of the greatest winter-sports land and scenery in all the world."

* * *

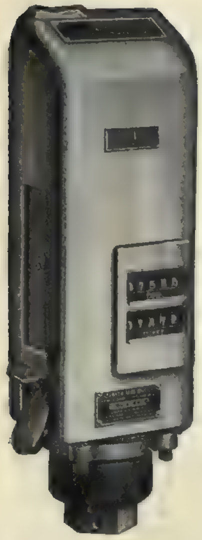
Goodyear Pneumatic Bus Tires are made with SUPERTWIST, the extra-elastic, extra-enduring fabric developed by Goodyear for Goodyear Tires. They are made with the famous All-Weather Tread, famous for traction, for skidless travel, and for wear. They are durable. They cushion. And they cost less per tire-mile.

Only Goodyear Tires are made with SUPERTWIST—yet they cost you no more.

More people ride on Goodyear Tires
than on any other kind

BUS TIRES

Made with SUPERTWIST



The *largest* Bus operating company in the United States purchases 450 additional Johnson Fare Boxes

The Public Service Transportation Co.—the bus subsidiary of the Public Service Co. of Newark, New Jersey—operates more buses than any other company in the United States, and now will have 807 buses equipped with Johnson Electric Fare Boxes.

In addition, this company has operated 1400 Johnson Electric Fare Boxes on their trolley cars for 2 years with such success that they also placed them on 807 buses.

Type J Electric Fare Boxes for buses are designed and built to accurately register instantly, audibly, and visibly all the fares collected. Type J Equipment connects right to the twelve-volt battery already on the bus. The drain on the battery is insignificant; in fact, fares can be registered accurately even after the battery has reached the stage where the headlights will no longer function. The use of elbow clamps permits this equipment to be installed in an hour's time.

This Type J Equipment is expressly made for a five and ten-cent fare, or ten-cent fare and one size metal token. A Bell for every passenger means accuracy. The Fare Box at no time is under the direct control of the operator, and the last fare paid is always visible for inspection. We are now ready to make immediate deliveries and installations. This Equipment on your buses will pay for itself every ninety days, and with ordinary maintenance will last ten years. This Box carries the Johnson Standard Guarantee and Guarantee with us means that our devices make good, or we will.

Electro-magnet type of fare box—NOT motor driven; no drain on battery.

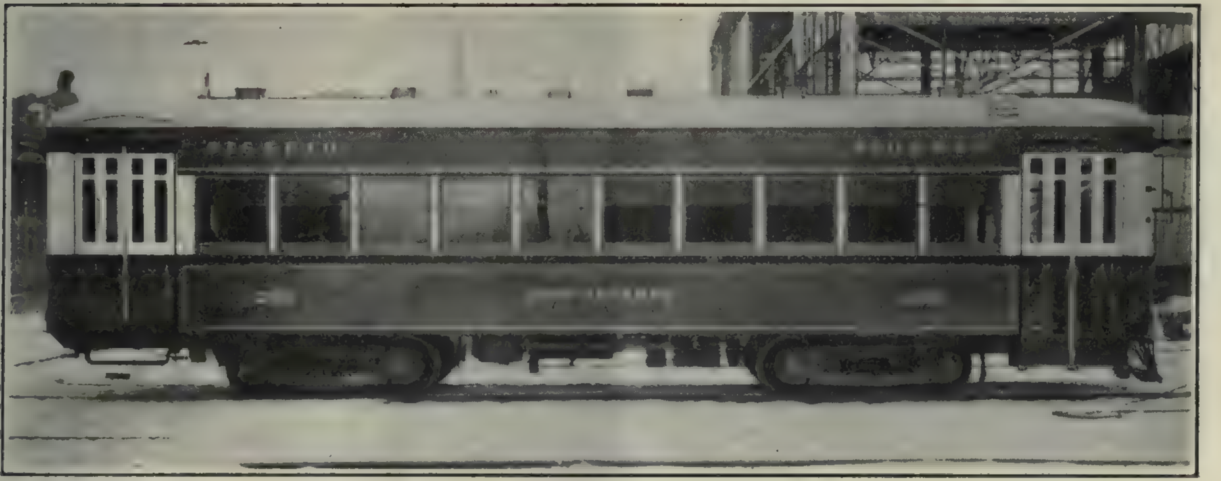
JOHNSON FARE BOX CO.

CHICAGO, ILL.
4619 Ravenswood Ave.

NEW YORK, N. Y.
2 W. 61st St.

SOUTHERN INDIANA
Gas & Electric, Evansville, Indiana

Installs New, Modern Interurbans



New Lightweight Interurban Cars Now Being Delivered To Evansville, Ind.

THE APPEARANCE of these lightweight single end interurban cars is greatly enhanced by the attractive stream line painting; the body color is dark blue with a red belt rail continuing around the entire car. The posts are cream colored, and all striping, lettering and numbering is in gold. The interior finish is mahogany, and the comfortable upholstered St. Louis Car Co. seats are covered with a pleasing shade of Spanish leather. The car is arranged with a smoking compartment and toilets. The luggage compartment is in the rear vestibule.

The cars are mounted on St. Louis Car Co. E.I.B. 64 Trucks equipped with quadruple 35 hp. motors and safety devices. Back up device assures safe movement when necessary to reverse car, as operator must go to the rear of car to accomplish this.

St. Louis Car Company
St. Louis, Mo.
"The Birthplace of the Safety Car"

Illustration shows International Poles in service of the Louisiana Electric Co. (Stone & Webster)

Long Life Makes Low Cost

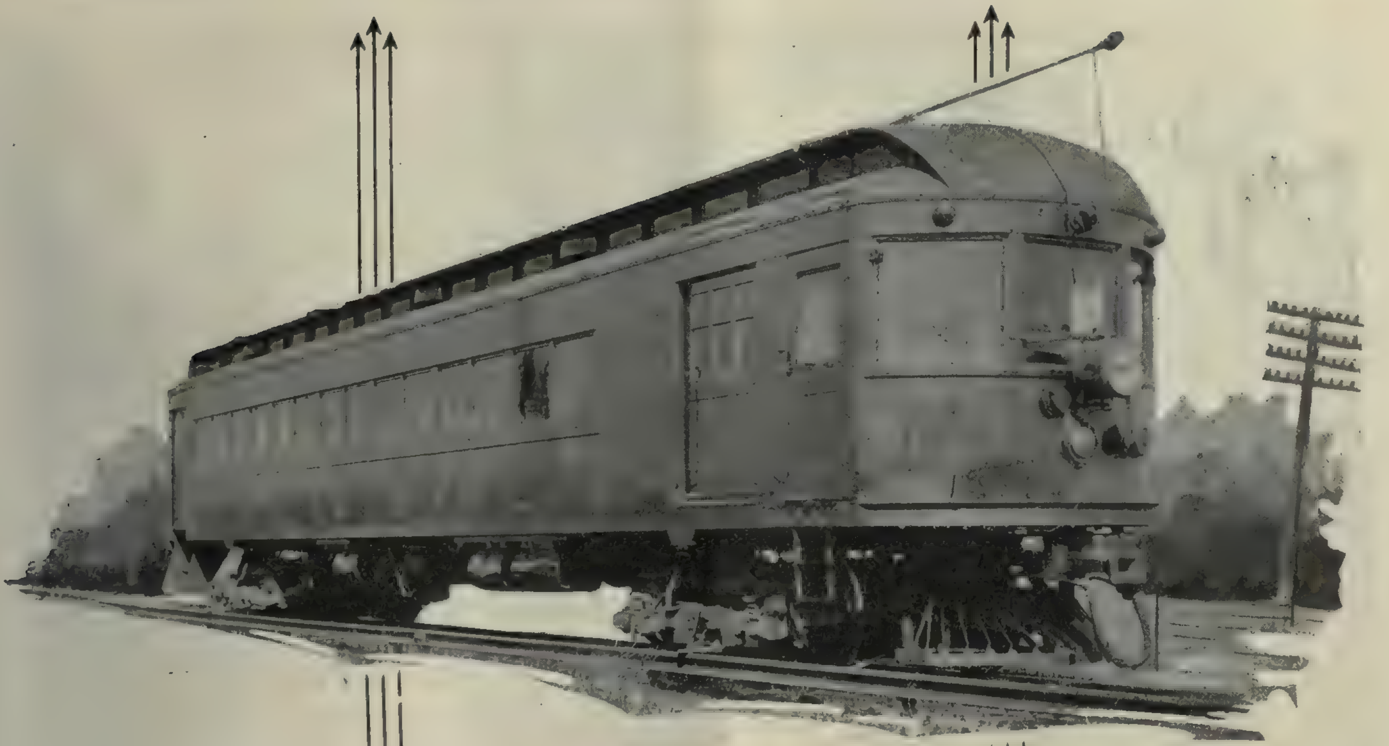
THE FIRST COST of Creosoted Pine Poles, all sizes and lengths, compares favorably with other poles. But, on the basis of annual cost, the real economy becomes strikingly apparent. Creosoted Pine Poles are strongest and have longest life. When the initial investment is distributed over their 35 to 40 years of service, the very low annual cost proves that the pole that lasts longest is least expensive.

Other marked economies are due to the fact that the Creosoted Pine Pole is so far superior in strength and durability that standard construction prescribes that smaller poles or fewer poles per mile be used in Creosoted Pine construction than when other woods are used.

2 IC 7
The International Dating Nail

International Creosoting & Construction Co.
Galveston—Texarkana—Beaumont

International
Creosoted Yellow Pine Poles



AN interurban car on the Scioto Valley Railway & Power Company System, equipped with "STANDARD" Rolled Steel Wheels.

Rolled Steel Wheels
Quenched and Tempered Carbon Steel Axles
Coil and Elliptic Springs
Armature Shafts

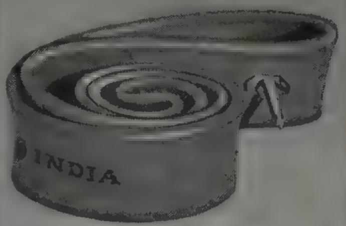
STANDARD STEEL
WORKS COMPANY
PHILADELPHIA, PA.

BRANCH OFFICES:
CHICAGO
ST. LOUIS
NEW YORK
HOUSTON, TEXAS
PORTLAND, ORE.
RICHMOND, VA.
SAN FRANCISCO
ST. PAUL, MINN.
PITTSBURGH, PA.

WORKS: BURNHAM, PA.

INDIA Balloons
(Patented Construction)
Comfort and long wear—ideally combined

INDIA Heavy Service
"The most favorably talked about heavy service tire in America today."



INDIA True-Blue
(HEAT PROOF) Inner Tube
The first to successfully overcome premature aging caused by high heat of present low-pressure, high-speed running conditions.

TIRES
ARE JUST TIRES—
UNTIL YOU TRY AN INDIA

Tires are tires! Yet one holds under grinding wear and punishing heat. Another blows out.

Why the difference?

Because the tire that stands the grind—in addition to rubber and fabric and skilled workmanship—has built into it an ideal. No other ingredient counts so much in mileage.

The India business was founded on an ideal—"to Make the Best Tire it is Possible to Make." No effort has been spared to do this. Consequently, the India line has exclusive features—easily demonstrated advantages—which put India tires years ahead of the tires with which most bus and truck owners are familiar.

The Gum-Weld Cushion reduces friction (heat), overcomes "tread separation" and cushions road shocks more softly over the entire carcass of the tire.

The patented construction of India Balloons and Bus Balloons combines complete flexibility of sidewalls with long wear and freedom from punctures.

The India True-Blue (HEAT-PROOF) inner tube is the first to successfully overcome "burning-up" of tubes from the high heat of present low pressure, high speed running conditions.

So no matter how many tires you use—or in what kind of service—India tires and tubes will save you money.

INDIA
TIRES

INDIA TIRE & RUBBER CO. AKRON, O.

Everlastingly Quiet

Timing gears must be silent, accurate, durable. To get two of these qualities at the sacrifice of one is not difficult. The real problem is to combine all three.

Quietness in timing gears is one thing. Durability and accuracy are another matter. Ordinary timing gears are made quiet at the expense of long life and correct timing. The combination of durability, accuracy and silence has baffled motor manufacturers for a generation.

Cast iron gears, non-metallic gears and silent chains are all quiet, but none of them are durable. When wear takes place, inaccurate timing results and that means irregular running and loss of engine power. Replacements are troublesome and expensive.

Ordinary steel gears are relatively long lived and accurate; but incurably noisy.

The perfect timing drive is none of these! It is made of steel end-grained upset drop-forgings. The teeth are cut helical and case-hardened. That means everlasting durability and unvarying accuracy. Finally, the teeth are generator ground and as a result roll silently.

These features are combined in Mack timing gears alone. There can be no imitators because Mack not only designed, patented and built the machine which will generator grind helical teeth, but uses them exclusively.

The Lincoln Traction of Lincoln, Nebraska, Use
Mack Buses to Supplement their Street Car Service

Repeat Orders Prove Satisfaction

Especially is this true when an operator has had experience enabling him to compare. Most Mack owners have—and continue to choose Macks.

In one operation, over a given time, Macks operated 310,000 miles per bus, whereas the next best record of any other make of bus in the fleet showed a mileage of only 235,000. No Mack engine was out more than once—on the other makes, at least four times and in some cases seven. Hours in the repair shop are not profitable hours—Mack hours are road hours.

Many wasted shop hours are spent on timing gear adjustments and replacements—but not on Macks.

Mack operators realize it is better to pay the price than the penalty—better to buy Macks—and get security.

Mack Trucks, Inc.
International Motor Company
25 Broadway, New York City

Nine-cylinder, 15,000-hp. Diesel engine in a generating station at Hamburg, Germany. A De Laval Oil Purifier protects this engine with clean lubricating oil.

The
Same Sauce
for
GOOSE
and
GANDER

You remember the age old proverb. It applies directly to the solution of the basic problem of lubricating the modern bus engine and the world's largest Diesel engine. "Keep a *clean* film of oil between the shaft and the journal." Let that oil film be destroyed—let it be diluted with gasoline or water—let it be a carrier of sludge and metallic particles—and bearing death follows. Just like ground glass in your food.

Bus operators who know costs, treat their engines with the respect they deserve. To them the hood is the door to an *engine room.*

The De Laval Crankcase Oil Reclaiming Outfit removes impurities from used crankcase oil, making it equal and in some respects better than new oil. It restores its viscosity—its power to lubricate—its ability to resist heat—enables you to change oil more frequently, and saves thousands of gallons of oil at small cost.

Get the latest De Laval publication on crankcase oil, being sure to ask for Bulletin No. 108-R.

The DeLaval Separator Company

165 Broadway, New York
DE LAVAL PACIFIC COMPANY
San Francisco
600 Jackson Blvd., Chicago

DE LAVAL

Crankcase Oil Reclaiming Outfit
Car Axle Oil Reclaiming Equipment-Transformer Oil Purifiers

Creosoted ties postpone expensive track repairs

THERE is a more urgent need for creosoted ties in closed than in open track. It costs more to tear up pavement and renew decayed ties than it does to relay them in ordinary open ballasted track. The more expensive the pavement, the greater the average annual saving when the period between tie renewals is increased through the use of treated ties. One road reports that creosoted ties in open track effect an average annual saving of $290.40 per mile. The same road finds a saving of $528 per mile per year in closed track with pavement costing $1.00 per square yard and $1,188 per mile per year under pavement costing $3.50 per square yard.

The old fallacy that most any tie under pavement would last as long as the rail has been thoroughly disposed of by experience. There is plenty of moisture in a closed track to promote the decay of a wooden tie. The way to forestall such decay is to use Amcreco creosoted ties made of the best selected timber and treated to the highest standards known in the industry. These ties have stood the test of time on many of the country's largest railroads. This company operates 17 plants today to supply the demand for Amcreco products.

Information and quotations on ties, timber, piling and poles are available from our nearest sales office.

SALES OFFICES
332 So. Michigan Ave.
Chicago
350 Madison Ave.
New York City
410 W. Main St
Louisville, Ky.
Brunswick, Ga.
Bogalusa, La.

AMERICAN CREOSOTING COMPANY
INCORPORATED

COLONIAL CREOSOTING COMPANY
INCORPORATED

AMCRECO
LOWRY PROCESS
CREOSOTED WOOD

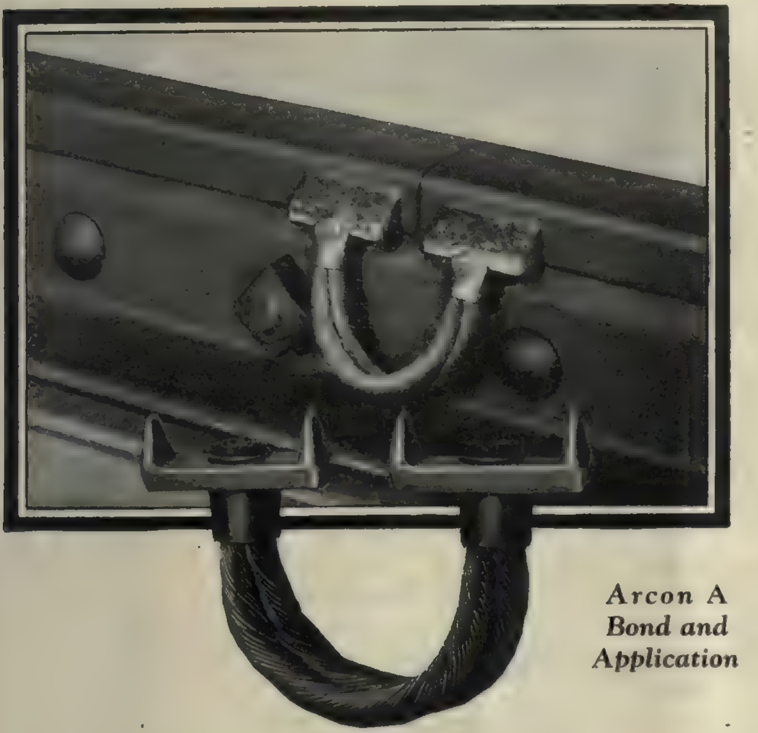
GEORGIA CREOSOTING COMPANY
INCORPORATED

LOUISVILLE ~ KENTUCKY

ER11-29Gray

ARCON RAIL BONDS

TRADE MARK REG.



Arcon A
Bond and
Application

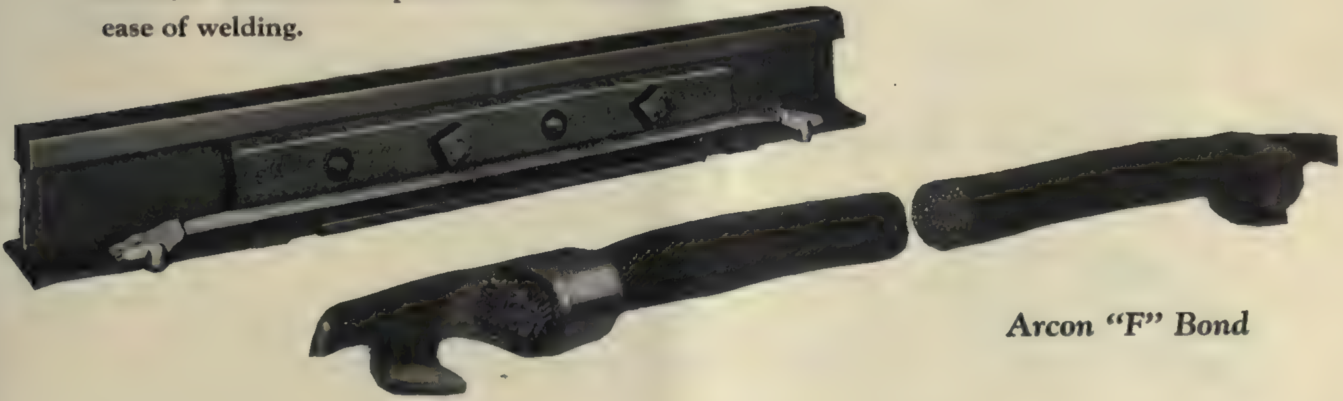
Arcon bonds make positive the welding of bonds with copper electrodes.

All unnecessary retaining walls have been omitted from these bonds. There are no box shaped metal pockets to interfere with directing the arc.

The open shape of the Arcon "A" terminal is especially desirable since the arc can be directed freely at the junction of the terminal and the rail.

Prices and descriptive literature sent on request.

To apply the Arcon "F" bond, hammer it onto the rail base and proceed to weld. The pointed hook holds the bond securely in place and will fit between tie and rail. An unusual amount of space is left to insure ease of welding.



Arcon "F" Bond

AMERICAN STEEL & WIRE COMPANY

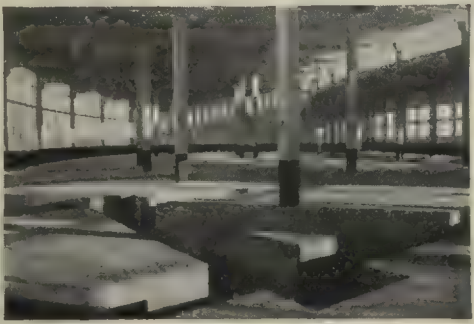
Sales Offices

Chicago New York Boston Cleveland Worcester Philadelphia Pittsburgh Buffalo Detroit Cincinnati Baltimore
Wilkes-Barre St. Louis Kansas City St. Paul Oklahoma City Birmingham Memphis Dallas Atlanta Denver Salt Lake City
Export Representative: U. S. Steel Products Co., New York
Pacific Coast Representative: U. S. Steel Products Company, San Francisco, Los Angeles, Portland, Seattle

An increasingly large portion of the actual income derived from car card advertising service must be devoted to building and maintaining the prestige of car card advertising in the face of the active competition of all other media.

Creating and protecting our mutual interest is a costly item.

Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK



Interior, Round House, Stockton, Calif.

Interior, Machine Shop, Stockton, Calif.

Oil House, all precast concrete units, except platform, Sacramento, Calif.

Interior of Oil House, Sacramento, Calif.

Lowering roof slab unit, Round House, Stockton, Calif.

Placing wall slab, with window frame and sash, machine shop, Stockton, Calif.

All of the structures illustrated are composed of precast concrete units. Built for the Western Pacific R. R., by W. A. Bechtel, Contractor and Designer, San Francisco, Calif.

Precast Concrete Units

for railway structures which are duplicated at various locations, offer important economies. Factory principles of production and control of quality are applied to the manufacture of the concrete units. Thus the owner secures the reliability and durability of a fire safe concrete structure with complete flexibility of arrangement and size.

PORTLAND CEMENT *Association*

Concrete for Permanence CHICAGO

Bankers and Engineers

Ford, Bacon & Davis
Incorporated
Engineers
115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

STONE & WEBSTER
Incorporated
EXAMINATIONS REPORTS APPRAISALS
ON
INDUSTRIAL AND PUBLIC SERVICE PROPERTIES
New York Boston Chicago

SANDERSON & PORTER
ENGINEERS
PUBLIC UTILITIES & INDUSTRIALS
Design Construction Management
Examinations Reports Valuations
CHICAGO NEW YORK SAN FRANCISCO

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER, MASSACHUSETTS
REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

C. B. BUCHANAN President W. H. PRICE, JR. Sec'y-Treas. JOHN F. LAYNG Vice-President
BUCHANAN & LAYNG CORPORATION
Engineering and Management, Construction, Financial Reports, Traffic Surveys and Equipment Maintenance
BALTIMORE
1904 Citizens National Bank Bldg.
Phone: Hanover: 2142
NEW YORK
49 Wall Street

HEMPHILL & WELLS
CONSULTING ENGINEERS
Gardner F. Wells Albert W. Hemphill
APPRAISALS
INVESTIGATIONS COVERING
Reorganization Management Operation Construction
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WALTER JACKSON
***Consultant on* Fares and Motor Buses**
The Weekly and Sunday Pass—Differential Fares—Ride Selling
143 Crary Ave., Mt. Vernon, N. Y.

KELLY, COOKE & COMPANY
ENGINEERS
Operation and Management
Traffic and Transportation Surveys
PARKWAY at SIXTEENTH ST. PHILADELPHIA

The J. G. White Engineering Corporation
Engineers—Constructors
Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.
43 Exchange Place New York

THE BEELER ORGANIZATION
ENGINEERS AND CONSULTANTS
Traction - Traffic - Equipment - Power Investigations
TRANSPORTATION, TRAFFIC, AND OPERATING SURVEYS
COORDINATING SERVICE—FINANCIAL REPORTS
APPRAISALS—MANAGEMENT
52 Vanderbilt Ave. New York

ENGELHARDT W. HOLST
Consulting Engineer
Appraisals Reports Rates Service Investigation
Studies on Financial and Physical Rehabilitation
Reorganization Operation Management
683 Atlantic Ave., BOSTON, MASS.

KELKER, DeLEUW & CO.
CONSULTING ENGINEERS
REPORTS ON
Operating Problems Valuations Traffic Surveys
111 W. Washington Street, Chicago, Ill.

DAY & ZIMMERMANN, INC.
ENGINEERS
DESIGN - CONSTRUCTION - REPORTS
VALUATIONS - MANAGEMENT
NEW YORK PHILADELPHIA CHICAGO

STEVENS & WOOD
INCORPORATED
ENGINEERS AND CONSTRUCTORS
120 BROAWAY, NEW YORK
ENGINEERING CONSTRUCTION YOUNGSTOWN, O. FINANCING MANAGEMENT

McCLELLAN & JUNKERSFELD
Incorporated
ENGINEERING AND CONSTRUCTION
Examinations—Reports—Valuations
Transportation Problems—Power Developments
68 Trinity Place, New York
Chicago St. Louis

J. ROWLAND BIBBINS
Engineer—2301 Connecticut Ave., N.W., Washington, D. C.
TRANSPORTATION SURVEYS
Organized Traffic Relief and Transit Development Co-ordinating Motor Transport, Railroad and City Plans, Service, Routing, Valuation, Economic Studies
EXPERIENCE IN 20 CITIES

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of Water Tube Boilers of continuing reliability

BRANCH OFFICES

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PHILADELPHIA, Packard Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
PHOENIX, ARIZ., Heard Building
DALLAS, TEX., 2001 Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., 805 Gasco Building

THE BABCOCK & WILCOX COMPANY STEAM

WORKS
Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

BRANCH OFFICES

DETROIT, Ford Building
NEW ORLEANS, 344 Camp Street
HOUSTON, TEXAS, 1011-13 Electric Building
DENVER, 444 Seventeenth Street
SALT LAKE CITY, 405-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building

Type R-11
Double Register

International Registers

Made in single and double types to meet requirements of service. For hand or foot, mechanical or electric operation. Counters, car fittings, conductors' punches.

The International Register Co.
15 South Throop Street, Chicago, Illinois

THE WORLD'S STANDARD

"IRVINGTON"

Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slott Insulation Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.
Irvington, N. J.

Sales Representatives in the Principal Cities

THE P. EDWARD WISH SERVICE
50 Church St. NEW YORK — *Street Railway Inspection* DETECTIVES — 131 State St. BOSTON

Our advertisement in the issue of January 15 showed how

HASKELITE and PLYMETL

are being regularly used to improve old equipment.

Another ad will appear February 5.

HASKELITE MANUFACTURING CORPORATION
133 W. Washington St., Chicago, Ill.

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

Commercial Co-ordination of Transportation

A. B. Cole
Commercial Consultant
500 Shelbourne Ave., Wilkinsburgh, Pa. (Pittsburgh)

UNA

RAIL BONDS-RAIL JOINTS
DYNAMOTORS
WELDING ROD

UNA Welding & Bonding Co.
Cleveland, Ohio.

Transmission Line and Special Crossing Structures, Catenary Bridges

WRITE FOR OUR NEW DESCRIPTIVE CATALOG

ARCHBOLD-BRADY CO.
Engineers and Contractors SYRACUSE, N. Y.

INDUSTRIAL GASES

OXYGEN
ACETYLENE
I.O.C. SYSTEM
HYDROGEN
NITROGEN

Quick shipment and low prices also on cylinders, valves, torches, regulators and supplies.

International Oxygen Co., Main Offices: Newark, N. J.
Branches: New York Pittsburgh Toledo

CHILLINGWORTH
One-Piece Gear Cases
Seamless—Rivetless—Light Weight
Best for Service—Durability and Economy. *Write Us.*

Chillingworth Mfg. Co.
Jersey City, N. J.

M-J Armature Babbitt

No less than twenty-five different grades of Babbitt have been successfully perfected in the More-Jones line, designed for various services and at varying prices. "Armature" for electric railways is the recognized standard. *Let us quote you.*

More-Jones Brass & Metal Co.
St. Louis, Mo.

MORE-JONES
QUALITY PRODUCTS

B. A. HEGEMAN, Jr., President H. A. HEGEMAN, First Vice-Pres. and Treas.
F. T. SARGENT, Secretary W. C. PETERS, Vice-Pres. Sales and Engineering

National Railway Appliance Co.
Grand Central Terminal, 452 Lexington Ave., Cor. 45th St., New York
BRANCH OFFICES
Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago, Ill.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Anglo-American Varnish Co., Varnishes, Enamels, etc.
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Genesco Paint Oils
Dunham Hopper Door Device
Garland Ventilators
Walter Tractor Snow Plows
Feasible Drop Brake Staffs
Ft. Pitt Spring & Mfg. Co., Springs
Flaxlinum Insulation
Anderson Slack Adjusters
Economy Electric Devices Co., Power Saving and Inspection Meters
"Topesealed" Lamps
Bus Lighting Equipment

WM. WHARTON JR. & CO. INC.
TISCO MANGANESE STEEL TRACKWORK.

Wharton trackwork, in which the famous Tisco Manganese Steel has been used, will be found on the leading railways of the country.

Plant: Easton, Pa.

Atlanta
Baltimore
Boston
Buffalo
Chicago
Cincinnati
Cleveland
Dallas
Detroit
Kansas City
Los Angeles
Milwaukee
Minneapolis
New Orleans
New York
Philadelphia
Pittsburgh
San Francisco
St. Louis
Syracuse
Seattle
Washington, D. C.
Berlin, Germany

Investigations *Reports*
Valuations

The American Appraisal Company
A National Organization

Lorain Special Trackwork
Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY
Johnstown, Pa.
Sales Offices:
Atlanta Chicago Cleveland New York
Philadelphia Pittsburgh Dallas
Pacific Coast Representative:
United States Steel Products Company
Los Angeles Portland San Francisco Seattle
Export Representative:
United States Steel Products Company, New York, N. Y.

Bethlehem Products for
Electric Railways

Tee and Girder Rails; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Alloy Steel Crossings; Abbott and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates and Pole Line Material.

Catalog Sent on Request

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

BETHLEHEM

FARE
BOXES for BUSES

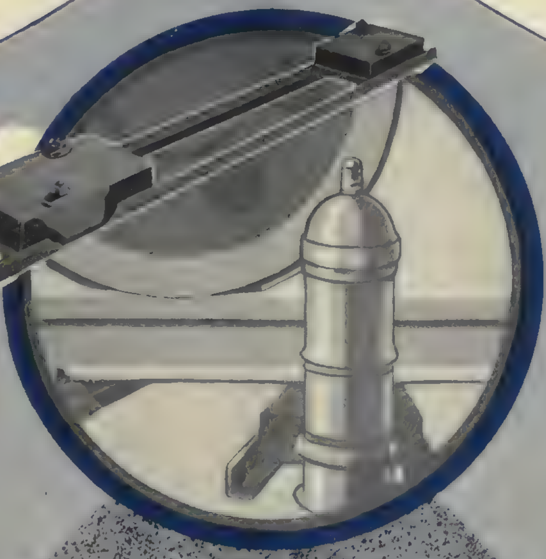
Let us tell you of this especially designed box for this class of service.

The Cleveland Fare Box Co.
4900 Lexington Ave., Cleveland, O.
Canadian Cleveland Fare Box Co., Ltd.
Preston, Ontario

COIN COUNTING And Sorting Machines CHANGES CARRIERS Tokens

We don't know how long Dayton "Shock Absorber" Track will last—

We've only been in business fifteen years



The Dayton Mechanical Tie Co.,
Dayton, Ohio.

In the fifteen years we have been making and selling Dayton Resilient Ties, no track laid on them has worn out.

"Shock Absorber" track on the first ties we made is still in such excellent condition, after fifteen years of heavy traffic, that experts predict it will last ten years more. A "sleeper" that will last twenty-five years beats Rip Van Winkle.

Whether the experts are too enthusiastic or not, we do not know. But we do know that tracks laid on Dayton resilient ties—"Shock Absorber" tracks—will last and stay smooth plenty long enough to reduce track costs amazingly. Permanent smoothness also holds down rolling stock costs, and attracts more patronage.

More than 100 cities have Dayton "Shock Absorber" tracks. More than 80% of Dayton Customers repeat. Surely this indicates that Dayton Ties have something that is worth your thorough investigation—write today for literature and prices.

The Dayton Mechanical Tie Co.,

Dayton, Ohio.

Cold Dinners

for *your* passengers?

Not if you use

AJAX

BABBITT *for* ARMATURES

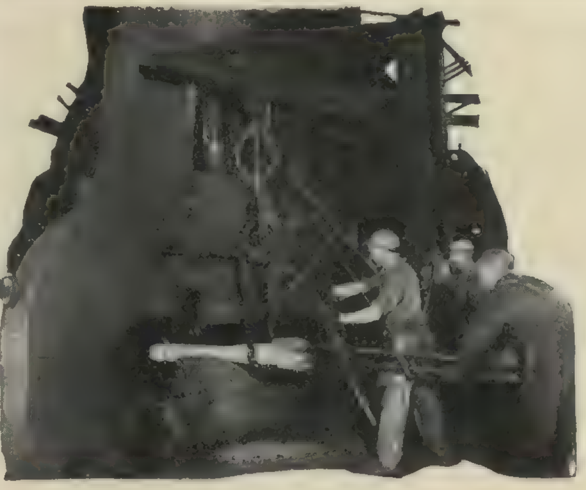
keeps the rolling stock rolling

The Ajax Metal Company

Established 1880

PHILADELPHIA

NEW YORK CHICAGO BOSTON CLEVELAND



AXLES

MORE than sixty years of experience in the manufacture of axles, coupled with every facility for correct heat treatment and accurate testing, insure the meeting of the specification in the finished product.

Prompt deliveries of Car and Tender Axles, Engine Truck and Driving Axles, Electric Motor and Street Car Axles, Miscellaneous Forgings.

CARNEGIE STEEL COMPANY

General Offices · Carnegie Building : 434 Fifth Avenue

PITTSBURGH PENNSYLVANIA

1835

Where performance counts

use

Le Carbone Carbon Brushes

They talk for themselves

W. J. Jeandron

Hoboken Factory Terminal,
Building F, Fifteenth Street, Hoboken, N. J.

Pittsburgh Office: 634 Wabash Bldg.

Chicago Office: 1657 Monadnock Block

San Francisco Office: 525 Market Street

Canadian Distributors: Lyman Tube & Supply Co., Ltd.
Montreal and Toronto

PANTASOTE

Trade Mark

Seat and Curtain Materials

There is no substitute for Pantasote

AGASOTE

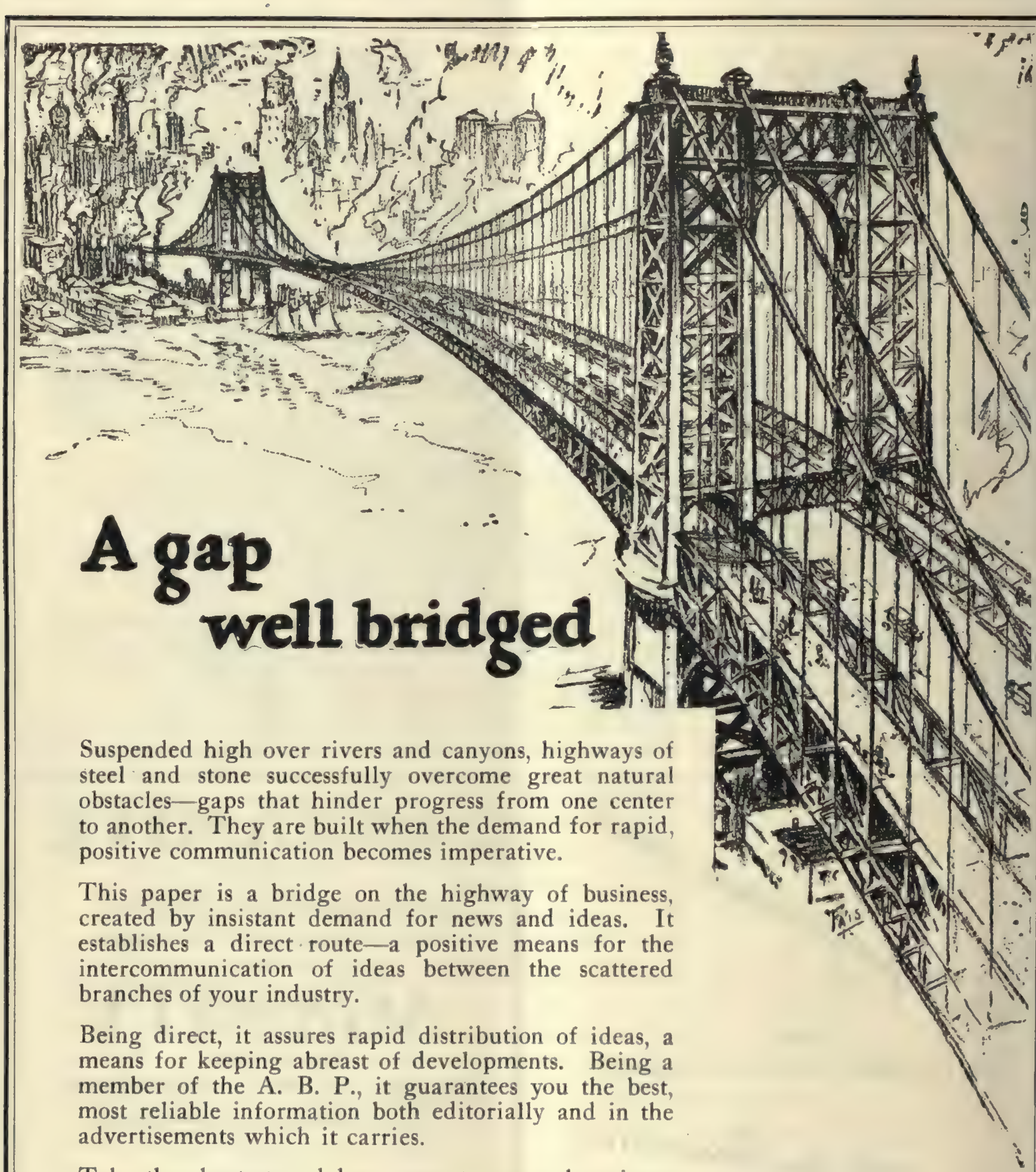
Trade Mark

Roofing—Headlining—Wainscoting

The only homogeneous panel board

standard
for electric railway cars
and motor buses

The PANTASOTE COMPANY Inc.
At 46th 250 Park Avenue Street
NEW YORK
Pantasote Products for Both ELECTRIC RAILWAYS AND BUSES



A gap well bridged

Suspended high over rivers and canyons, highways of steel and stone successfully overcome great natural obstacles—gaps that hinder progress from one center to another. They are built when the demand for rapid, positive communication becomes imperative.

This paper is a bridge on the highway of business, created by insistant demand for news and ideas. It establishes a direct route—a positive means for the intercommunication of ideas between the scattered branches of your industry.

Being direct, it assures rapid distribution of ideas, a means for keeping abreast of developments. Being a member of the A. B. P., it guarantees you the best, most reliable information both editorially and in the advertisements which it carries.

Take the shortest and best route to up-to-the-minute news. This A. B. P. paper leaves no gap in supplying information which is helpful to you in the conduct of your business.

THE ASSOCIATED BUSINESS PAPERS, Inc.
Executive Offices: 220 West 42nd St., New York, N. Y.

A. B. P.

An association of none but qualified publications reaching the principal fields of trade and industry.

The Electric Railway Journal is a member of The A. B. P.

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

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1 to 3 inches	$4.50 an inch
4 to 7 inches	4.30 an inch
8 to 14 inches	4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An *advertising inch* is measured vertically on one column, 3 columns—30 inches—to a page.

There is a

Searchlight Section

in each McGraw-Hill paper:

[1] American Machinist (American Edition)
[2] Bus Transportation
[3] Chemical and Metallurgical Engineering
[4] Coal Age
[5] Electrical World
[6] Electrical Merchandising
[7] Radio Retailing
[8] Journal of Electricity
[9] Electric Railway Journal
[10] Engineering and Mining Journal
[11] Engineering News-Record
[12] Industrial Engineer
[13] Power
[14] Ingeniería Internacional (International Engineering—Spanish)
[15] American Machinist (European Edition)

Each of these 15 papers is the leading periodical of the field it serves.

"Searchlight" advertisements will get you in touch with the important men of these important fields.

POSITIONS VACANT

WELDING foreman for thermit and electric welding, grinding, and cutting on city and interurban track work. To handle gang of six or eight men. Straight time position. Start at $125 per month. Headquarters in large Middle Western city. Give age, education, previous experience and how soon you can report for work. P-963, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

POSITIONS WANTED

OPERATING man; capable of taking charge of transportation department of electric railway. Practical experience in each of its branches. Highest references. PW-944, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

SUPERINTENDENT of rolling stock, 24 years' experience, open for position. PW-960, Electric Railway Journal, Tenth Ave. at 36th St., New York.

SALESMAN AVAILABLE

LET ME put on your preferred stock customer ownership sale. Can successfully conduct campaign of any size and handle both sales and accounting details. Wide experience. Highest of references. SA-964, Electric Railway Journal, 7 So. Dearborn Street, Chicago, Ill.

FOR SALE

Rail and Ties

100 tons new Trolley **Girder Rail**, Lorain Sec. 103 with Splice Bars.
1000 new oak **Trolley Ties**, 8 ft. long.
LOW PRICE

TACONY HOUSING ASSOCIATION
Tacony, Philadelphia

FOR SALE

15 BIRNEY SAFETY CARS

Brill Built
West. 508 or G. E. 264 Motors
Cars Complete—Low Price—Fine Condition

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

AIR COMPRESSORS

12 General Electric CP-27.
6 General Electric CP-28.
16 Westinghouse DH-16.

IRVING S. VAN LOAN CORPORATION
1750 Broadway, New York City

Specialists in street cars or any part of a street car.
Illustrated bulletin supplied on request.

12 miles 70-lb. ASCE Relayers.
10 miles 60-lb. ASCE Relayers.

practically as good as new. Also 12 miles 4/0 figure 8 **Copper Wire** practically new.

M. K. FRANK
Park Row Bldg. New York City
Union Trust Bldg. Pittsburg, Penna.

ENGINES

and Miscellaneous Electrical Equipment

All in first class operating condition

1—Westinghouse Automatic Compound Engine, 200 hp., belt connected to one 150 kw. D.C. Generator, 550 volt, made by the National Electric Company.

1—Westinghouse Automatic Compound Engine, 350 hp., direct connected to Westinghouse 150 kw. D.C. Generator, 550 volt.

5—Feeder and Distribution Panels, Blue Vermont Marble, with Ammeters, Voltmeters, Circuit Breakers, Switches, etc. for above apparatus.

1—Rotary Converter, made by General Electric Company, 300 kw., 600 volts, 500 amps. D. C., A.C. side 60 cycle, 6 phase.

1—Commutator for Rotary Converter (New).

3—110 kw. Transformers 13,200/11,880 Primary, Secondary 430/286/143, together with Panels, Starting Switch and Reactance, Circuit Breaker, Ammeter, Voltmeter, Rheostat, etc.

Peekskill Lighting & Railroad Co.
Ossining, New York

WANTED

WANTED

WHEEL PRESS

in good condition, suitable for city and interurban work.

W-965, Electric Railway Journal
Tenth Ave. at 36th St., New York City

WANTED

Rotary Snow Plow

for electric railway. Address

MR. S. C. CHASE
411 Coal Exchange Bldg., Wilkes-Barre, Pa.

TO HELP YOU

LOCATE BUSINESS OPPORTUNITIES

"Searchlight" Advertising

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
- Collier, Inc., Barron G.

Air Brakes
- Westinghouse Air Brake Co.

Anchors, Guy
- Elec. Service Supplies Co.
- Ohio Brass Co.
- Westinghouse E. & M Co.

Appraisals
- American Appraisal Co.

Armature Shop Tools
- Columbia Machine Works
- Elec. Service Supplies Co.

Automatic Regulators, Voltage, Current & Synchronizing
- American Brown-Boveri Corp.

Automatic Return Switch Stands
- Ramapo Ajax Corp.

Automatic Safety Switch Stands
- Ramapo Ajax Corp.

Axles
- Bemis Car Truck Co.
- Bethlehem Steel Co.
- Brill Co., The J. G.
- Cincinnati Car Co.
- National Ry., Appliance Co.
- St. Louis Car Co.
- Standard Steel Works
- Westinghouse E. & M. Co.

Axles, Steel
- Carnegie Steel Co.

Babbitt Metal
- Ajax Metal Co.
- More-Jones Brass & Metal Co.

Badges and Buttons
- Elec. Service Supplies Co.
- International Register Co.

Bearings and Bearing Metals
- Ajax Metal Co.
- Bemis Car Truck Co.
- Brill Co., The J. G.
- Cincinnati Car Co.
- General Electric Co.
- More-Jones Brass & Metal Co.
- St. Louis Car Co.
- Westinghouse E. & M. Co.

Bearings, Center and Roller Side
- Cincinnati Car Co.
- Columbia Machine Works
- Stucki Co., A.

Bells and Buzzers
- Consolidated Car Heating Co.

Bells and Gongs
- Brill Co., The J. G.
- Cincinnati Car Co.
- Elec. Service Supplies Co.
- St. Louis Car Co.

Benders, Rail
- Railway Trackwork Co.

Bodies, Bus
- Brill Co., The J. G.

Body Material, Haskelite and Plymetl
- Haskelite Mfg. Corp.

Boilers
- Babcock & Wilcox Co.

Bond Testers
- American Steel & Wire Co.
- Electric Service Supplies Co.

Bonding Apparatus
- American Steel & Wire Co.
- Elec. Service Supplies Co
- Ohio Brass Co.
- Railway Trackwork Co.
- Una Welding & Bonding Co

Bonds, Rail
- American Steel & Wire Co.
- Elec. Service Supplies Co.
- General Electric Co.
- Ohio Brass Co.
- Railway Trackwork Co.
- Una Welding & Bonding Co.
- Westinghouse E. & M. Co.

Braces, Timber
- Duff Mfg. Co.

Braces, Trench
- Duff Mfg. Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
- Columbia Machine Works
- Elec. Ry. Equipment Co.
- Elec. Service Supplies Co.
- Hubbard & Co.
- Ohio Brass Co.

Brake Adjusters
- Brill Co., The J. G.
- Cincinnati Car Co.
- National Ry. Appliance Co.
- Westinghouse Tr. Br. Co.

Brake Shoes
- American Brake Shoe & Foundry Co.
- Bemis Car Truck Co.
- Brill Co., The J. G.
- St. Louis Car Co.

Brakes, Brake Systems and Brake Parts
- Bemis Car Truck Co
- Brill Co., The J. G
- Cincinnati Car Co.
- General Electric Co.
- National Brake Co
- Safety Car Devices Co.
- St. Louis Car Co.
- Westinghouse Tr. Br. Co.

Brakes, Magnetic Rail
- Cincinnati Car Co.

Brushes, Carbon
- General Electric Co.
- Jeandron, W. J.
- LeCarbone Co.
- Westinghouse E. & M. Co.

Brushholders
- Columbia Machine Works

Bulkheads
- Haskelite Mfg. Corp.

Bus Wheels, Steel
- Heywood-Wakefield Co.

Buses
- Brill Co., The J. G.
- International Motor Co.
- Mack Truck Co., Inc.
- St. Louis Car Co.

Bushings, Case Hardened and Manganese
- Bemis Car Truck Co.
- Brill Co., The J. G.
- Cincinnati Car Co.
- Columbia Machine Works
- St. Louis Car Co.

Cables (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
- Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
- Elec. Service Supplies Co.

Car Panel Safety Switches
- Consolidated Car Heating Co.
- Westinghouse E. & M. Co.

Car Steps, Safety
- Cincinnati Car Co.

Car Wheels, Rolled Steel
- Bethlehem Steel Co.

Cars, Dump
- Brill Co., The J. G.
- Differential Steel Car Co.
- St. Louis Car Co.

Cars, Gas-Electric
- Brill Co., The J. G.
- General Electric Co.
- Westinghouse E. & M. Co.

Cars, Gas, Rail
- Brill Co., The J. G.
- St. Louis Car Co.

Cars, Passenger, Freight, Express, etc.
- American Car Co.
- Brill Co., The J. G.
- Cincinnati Car Co.
- Kuhlman Car Co., G. C.
- National Ry Appliance Co.
- St. Louis Car Co.
- Wason Mfg. Co.

Cars, Second Hand
- Electric Equipment Co.

Cars, Self-Propelled
- Brill Co., The J. G.
- General Electric Co.

Castings, Brass Composition or Copper
- Ajax Metal Co.
- Cincinnati Car Co.
- More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
- American Steel Foundries
- Bemis Car Track Co.
- St. Louis Car Co.
- Standard Steel Works

Castings, Malleable & Brass
- Bemis Car Truck Co.
- St. Louis Car Co.

Catchers and Retrievers, Trolley
- Elec. Service Supplies Co.
- Ohio Brass Co.
- Wood Co., Chas. N.

Catenary Construction
- Archbold-Brady Co.

Ceiling Car
- Haskelite Mfg. Corp.
- Pantasote Co., Inc.

Ceilings, Plywood, Panels
- Haskelite Mfg. Corp.

Cement Products
- Portland Cement Assn.

Change Carriers
- Cleveland Fare Box Co.
- Electric Service Supplies Co.

Change Trays
- Cincinnati Car Co.

Circuit-Breakers
- General Electric Co.
- Westinghouse E. & M. Co.

Circuit Breakers, Oil
- American Brown-Boveri Corp.

Clamps and Connectors for Wires and Cables
- Columbia Machine Works
- Elec. Ry. Equipment Co.
- Elec. Service Supplies Co.
- General Electric Co.
- Hubbard & Co.
- Westinghouse E. & M. Co.
- Ohio Brass Co.

Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
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- Wm. Wharton, Jr. & Co.

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- Bethlehem Steel Co.
- Ramapo Ajax Corp.
- Wm. Wharton, Jr. & Co.

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- Gold Car Heat. & Ltg. Co.
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(Continued on page 46)

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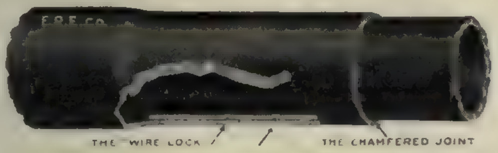

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Switches, Track (See Track Special Work

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Irvington Varnish & Ins. Co.

Ventilators, Car
Brill Co., The J. G.
Cincinnati Car Co.
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(Continued on page 48)

Chapman
Automatic Signals
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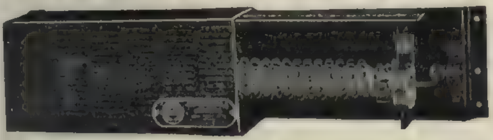

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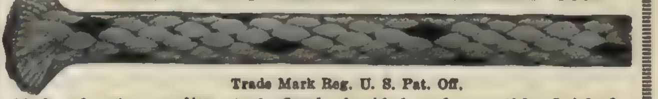

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ALPHABETICAL INDEX TO ADVERTISEMENTS

Page

A

Ajax Metal Co., The 41
American Appraisal Co., The ... 38
American Brass Co., The 47
American Brown Boveri Corp. . 8-9
American Car Co. 49
American Creosoting Co. 32
American Electrical Works 45
American Steel Foundries 4
American Steel & Wire Co. 33
Anaconda Copper Mining Co. ... 47
Archbold-Brady Co. 37

B

Babcock & Wilcox Co. 37
Beeler Organization 36
Bemis Car Truck Co. 45
Bethlehem Steel Co. 38
Bibbins, J. Rowland 36
Brill Co., The J. G. 49
Buchanan & Layng Corp. 36

C

Cameron Electrical Mfg. Co. ... 47
Carnegie Steel Co. 41
Chase, S. C. 43
Chillingworth Mfg. Co. 37
Cincinnati Car Co. 16-17
Cleveland Fare Box Co. 38
Cole, A. B. 37
Collier, Inc., Barron G. 34
Consolidated Car Fender Co. ... 47
Consolidated Car Heating Co. ... 37

D

Day & Zimmermann, Inc. 36
Dayton Mechanical Tie Co., Insert 39-40
De Laval Separator Co., The ... 31
Differential Steel Car Co., The . . 45
Duff Manufacturing Co., The ... 47

E

Electric Equipment Co. 43
Electric Ry. Equipment Co. 45
Electric Service Supplies Co. ... 7

F

Ford, Bacon & Davis 36
"For Sale" Ads 43
Frank, M. K. 43

G

General Electric Co. . 18, Back Cover
Gold Car Heating & Ltg. Co. ... 47
Goodyear Tire & Rubber Co., Inc. 20-21

H

Hale-Kilburn Co. 48
Haskelite Mfg. Corp. 37
"Help Wanted" Ads 43
Hemphill & Wells 36
Holst, Englehardt W. 36
Hubbard & Co. 45

I

India Tire & Rubber Co. 26
International Creosoting & Construction Co. 24
International Motor Co., Insert 27-28-29-30
International Oxygen Co. 37
International Register Co. 37
International Steel Tie Co., The 11-12-13-14
Irvington Varnish & Insulator Co. 37

J

Jackson, Walter 36
Jeandron, W. J. 41
Johnson Fare Box 22

K

Kelker, DeLeuw & Co. 36
Kelly, Cooke & Co. 36
Kuhlman Car Co. 49

L

LeCarbone Co. 41
Lorain Steel Co. 38

M

McClellan & Junkersfeld 36
More-Jones Brass & Metal Co. . . 38

N

Nachod and U. S. Signal Co. ... 47
National Brake Co., Inc. 19
National Pneumatic Co. 15
National Ry. Appliance Co. 38
Naugle Pole & Tie Co. 47

O

Ohio Brass Co. 5
Okonite-Callender Cable Company, Inc., The 45
Okonite Co., The 45

P

Pantasote Co., Inc. 41
Peekskill Lighting & R. R. Co. . 43
Perey Mfg. Co., Inc. 47
Portland Cement Asso. 35
Positions Wanted and Vacant ... 43

R

Railway Track-work Co. 48
Railway Utility Co. 47
Ramapo Ajax Corp. 47
Richey, Albert 36
Roebling's Sons Co., John A. ... 47

S

St. Louis Car Co. 23
Safety Car Devices Co. 10
Samson Cordage Works 47
Sanderson & Porter 36
Searchlight Section 43
Smith Heater Co., Peter 47
Standard Steel Works Co. 25
Star Brass Works 45
Stevens & Wood, Inc. 36
Stone & Webster 36
Stucki Co., A. 47

T

Tacony Housing Assn. 43

U

Una Welding & Bonding Co. ... 37
United States Rubber Co. Front Cover
Universal Lubricating Co. 45

V

Van Loan Corp., Irving S. 43

W

"Want" Ads 43
Wason Mfg. Co. 49
Westinghouse Traction Brake Co. 6
Wharton, Jr. & Co., Inc., Wm. . 38
"What and Where to Buy", 44-46-48
White Eng. Corp., The J. G. ... 36
Wish Service, The P. Edw. ... 37
Wood Co., Chas. N. 47

WHAT AND WHERE TO BUY—Continued from page 46

Nat'l. Ry. Appliance Co.
Railway Utility Co.
St. Louis Car Co.

Vestibule Linings
Haskelite Mfg. Corp.

Welded Rail Joints
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

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Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

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Ohio Brass Co.
Railway Trackwork Co.

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Roebling's Sons Co., J. A.

Welding Wire and Rods
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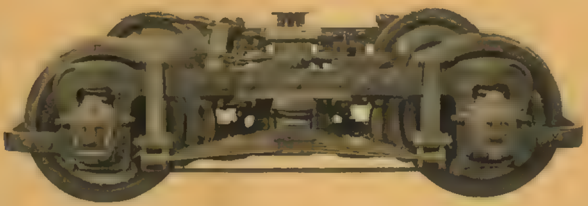

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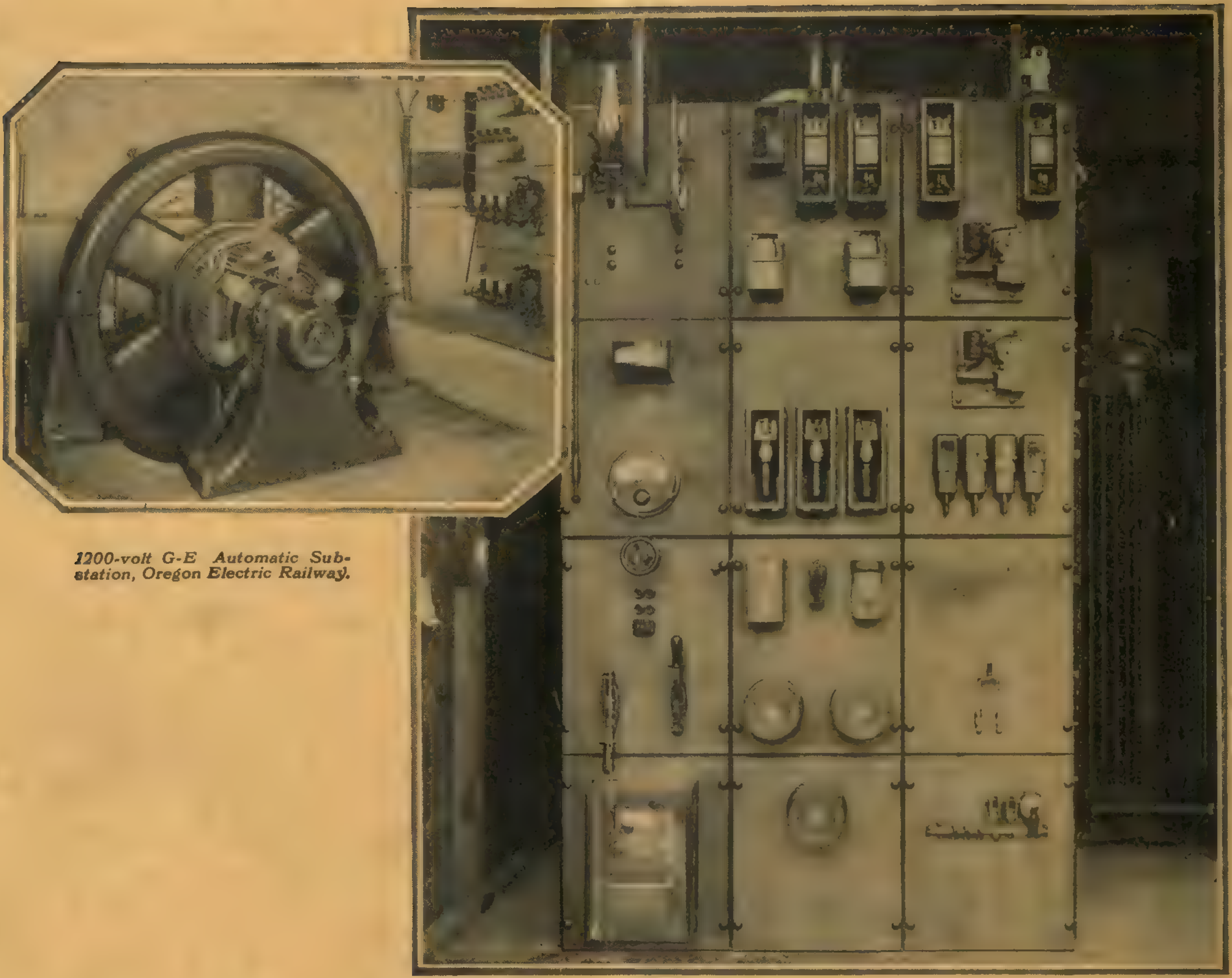

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3-20

GENERAL ELECTRIC

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ELECTRIC RAILWAY JOURNAL

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See
Pages 29, 30, 31, 32

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Overhead *Down*
by
Keeping it UP

A Perfect Fit

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1927

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Vol. 69
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Pages
231-272

CONTENTS

FEBRUARY 5, 1927

Editorials 231

The Five Fundamentals of Co-ordination 234
BY R. E. PLIMPTON.
Lexington, Ky., property evolves working definition. Encouraging growth in trolley riding even during periods when number of buses is greatly increased.

North Shore Opens New Station 238
Interurban line between Chicago and Milwaukee has a new station in the Chicago loop, reported to be the finest of its kind. It serves trains operated over elevated tracks and the companies' bus operations.

Saginaw Revives a Dead Service 239
Once discredited, the street car as a means of local transportation, has come back with a punch in the Michigan City. Intensive advertising and distinctive painting are important features of the campaign waged by the railway.

Trainmen's Timekeeping Simplified in Twin Cities 241

Berlin Carries Out Extensive Car Improvement Program 243
BY WILHELM PFORR.
Cardan drive is being used in various combinations and is considered especially desirable for trains of two motor cars. For such use two motors only are required to drive all the axles.

More Comforts Added to Crimson Limited 246
BY GEORGE HOSKINS.

Interesting Construction on Cleveland's New Car Station 247

The Readers' Forum 248

Maintenance Notes 250

Association News and Discussion 253

Active Interest Shown at Southern Equipment Meeting 253

Improvements Made in Car Equipment Apparatus .. 254
BY C. J. AXTELL.

Stepping on It 254
BY RAY S. FREHSE.

Wheel and Axle Maintenance at Atlanta 255
BY J. H. SQUIRES.

Overhauling on a 40,000-Mile Basis 256
BY A. J. NAQUIN.

Minority Only Benefits by Parking 256
BY JOHN A. MILLER, JR.

American Association News 257

News of the Industry 259

Recent Bus Developments 262

Financial and Corporate 264

Legal Notes 267

Personal Mention 268

Manufactures and the Markets 270

Refreshing the Spring

THERE is a legend of rare beauty among the Arabs which recites that the traveler when drinking at an oasis never consumes all of the precious fluid but pours back some in order to refresh the spring. In these days such a practice would be considered as co-operation to the *n*th degree, yet one fancies that the followers of Allah practiced it not only in a spirit of co-operation but in a rarer sense—to promote the Brotherhood of Man.

Those who read and those who write would do well to follow the example set by these nomads of the desert. Those who read are the consumers. They must not expect to consume all and not at some time refresh the spring from which other men drink in their search for knowledge.

ELECTRIC RAILWAY JOURNAL for many years has striven to be the well spring of information for the industry. It has always sought the substrata channels of information in order that the well should never go dry. But like the spring in the oasis, it will be ever refreshed if those who read will also write. If they will, in consuming the knowledge of others, not forget to give of their experience and knowledge in order that the Brotherhood of Man may become the vivifying spirit of the industry.

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Advertising Index—Alphabetical, 63; Classified, 58, 60, 63; Searchlight Section, 57

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Ohio Brass Co.

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CAR EQUIPMENT
MINING MATERIALS
VALVES

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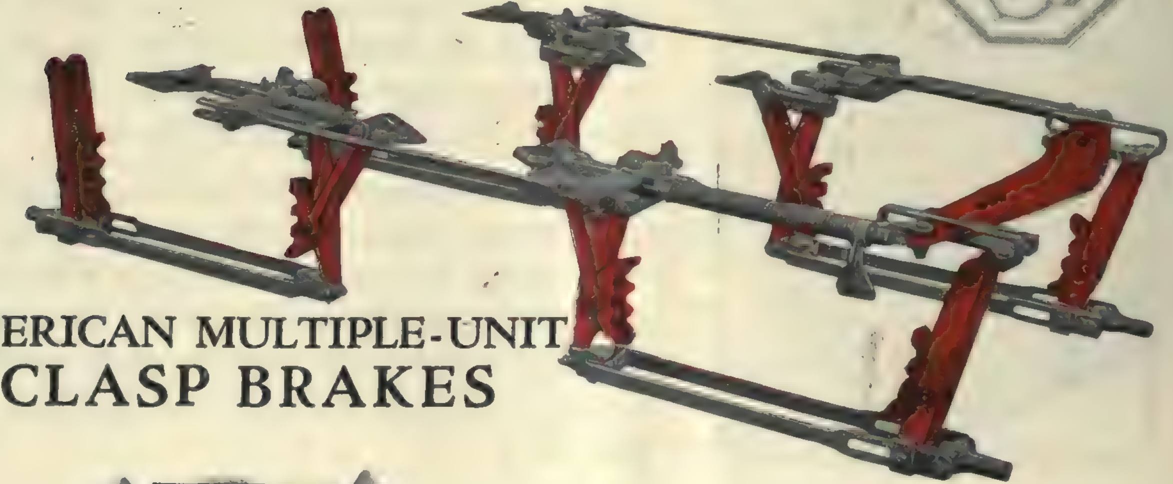

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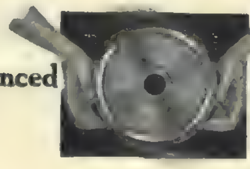
CLASP BRAKES



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NEW YORK CHICAGO ST. LOUIS

INDEX
OF THE
PAVED TRACK NOTE BOOK

Page
Foreword 2
Steel Ties from a Steel Center.................................. 4
Historical Trends in the Development of Paved Track................ 5
Deficiencies of Early Steel Tie Construction........................ 6
New Era in Steel Tie Development.............................. 6
Comparative and Economic Design of a Steel Tie.................. 8
Table of Bearing Values—Various Paved Track Designs............ 9
Twin Tie Design.. 9
Initial Costs Reduced by the Use of Twin Ties..................... 11
Twin Ties Cut Labor Costs...................................... 11
Bonding Eliminated with Twin Ties.............................. 13
Comparison of Actual Costs with Wood Ties and Steel Twin Ties.... 13
Distribution of Labor Costs on Steel Tie Construction.............. 14
Unit Costs Expressed in Man-Hours.............................. 14
Modern Traffic Loadings on the Track Area....................... 15
Paved Track Requires Concrete Foundation Under Modern Conditions. 16
Uniformity of Structure in Track Design.......................... 19
Inaccuracy in the Use of General Terms—A Scale of Rigidity........ 19
Flexibility and Rigidity are Comparative Terms..................... 20
Twin Tie Rail Fastenings... 23
The Advantages of Rail Tilting with Twin Ties..................... 25
Methods of Installing Twin Ties................................. 29
Planning the Initial Installation for Ultimate Rail Renewal.......... 32
Standard Construction Drawing.................... Between 32 and 33
Secondary Tamping to Eliminate Shrinkage........................ 34
The Renewal of Rail on a Twin Tie Foundation.................... 35
Salvaging Old Concrete Track Foundation......................... 41
Type 1—Renewal Tie... 43
Type 2—Renewal Tie... 44
Type 3—Renewal Tie... 45
Twin Ties for Bridges, Barns, Yards, and Industrial Sidings......... 47
Service Record of Steel Twin Tie Track........................... 48
"Car Noise as Affected by Type of Track Tie" by D. D. Ewing,
• Consulting Engineer, West Lafayette, Indiana.................. 55
Reference Section .... i-xii

The International Steel Tie Co., Cleveland, Ohio

20% more bearing surface
steel Twin Tie track

Automatic Signals by providing proper spacing of cars or trains, reduce trip time and enable more cars to be operated with consequent safety.

Interlocking installations at terminals and at grade crossings eliminate unnecessary stops and assure route continuity by means of signal indications.

Highway crossing protective devices of the flashing light, automatic flagman, or audible type, or combination of same, are a dependable insurance which soon pays off the investment.

Power operated remotely controlled switches are being used economically to accelerate Electric Railway traffic.

These Systems are products of the

Union Switch & Signal Co.
SWISSVALE, PA.

Headlights that *Spotlight!*

GOLDEN GLOW HEADLIGHTS

For buses

For electric railway cars

Though rain, snow and mist are added to the natural darkness of night, operators of cars and buses equipped with Golden Glow Headlights can quickly spot an object along the right-of-way.

The intense light is non-blinding and non-dazzling because the greenish-yellow glass reflector alters the violet portion of the spectrum. This glass reflector will not scratch, tarnish or corrode.

Golden Glow Headlights are made in various styles and sizes for every requirement. Complete particulars on request.

ELECTRIC SERVICE SUPPLIES CO.

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO
Illinois Merchants' Bank Bldg.

PITTSBURGH
1123 Bessemer Building

BOSTON
88 Broad St.

SCRANTON
316 N. Washington Ave.

DETROIT
General Motors Bldg.

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver

Making each passenger his own brakeman!

Each passenger boarding a car adds more weight to be controlled by the brakes.

If the ordinary air brake equipment is used, this additional weight will result in a longer stopping distance than when the car was empty—particularly if the car is of the modern light weight type. The longer stop reduces the schedule speed and slows up transportation service for the passenger.

If Westinghouse Variable Load Brakes are used, however, the weight added by each passenger entering the car does not remain uncontrolled, but is used to automatically adjust the brake mechanism so that a corresponding increase in retarding force is made to assure the same stopping distance as before his extra weight was added. Each passenger thus unknowingly helps to safeguard and expedite his journey.

This modern brake for modern cars makes for safer and faster transportation, because uniformly short stopping distances are assured by virtue of automatic adjustment of brake cylinder pressure as the passenger load changes.

Confer with our representative regarding the desirability of Westinghouse Variable Load Brakes for *your* new cars.

WESTINGHOUSE TRACTION BRAKE CO.
General Office and Works, WILMERDING, PA.

WESTINGHOUSE TRACTION BRAKES

In Lexington Kentucky

4½ Times Around the Earth
Per Pull-in ~
with YELLOW COACHES

YELLOW KNIGHT

For the Kentucky

17½¢ per bus mile!

The Kentucky Coach Company, a subsidiary of the Kentucky Traction & Terminal Company, operate eleven Yellow Coaches—all of the X-21 type.

During the first eight months of operation, since May 26, 1926, the Yellow fleet has reeled off 352,800 miles at an operating cost of approximately 17½¢ per bus mile.

It has carried over a million passengers.

It has operated 117,000 miles per pull-in; equiv-

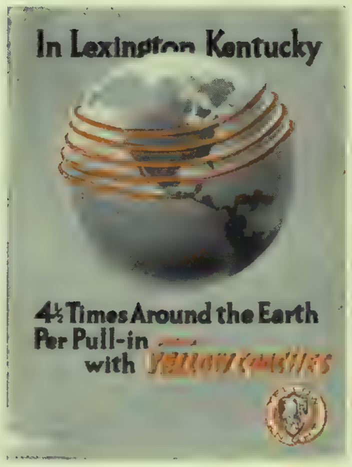
Coach Company

alent to encircling the earth four and a half times before a single coach has been hauled off the road.

In Lexington, co-ordination of coach and street car service with universal transfer under one rate of fare heightens the convenience and efficiency of city transportation where Yellow Coaches perform over four city routes, besides building a profitable charter business.

Yellow Coaches, in Lexington, are bringing to patrons a new conception of comfort, speed and convenience. To the operating company they are bringing tremendous mileage before pull-ins. They are successfully shouldering the bulk of service. They are the company's first choice from all standpoints.

Total Operating Expenses of the Kentucky Coach Company—



	Per Bus Mile
Superientendence plant and equipment	.0017
Maintenance of Buildings, fixtures and grounds	.000127
Maintenance of Bus Bodies	.00280
Maintenance of Chassis, Motor, etc.	.0218
Tires and Tubes	.0145
Maintenance Shop and Garage Equipment	.00009
Maintenance and Operation of Service Car	.00022
Miscellaneous Shop Expenses	.00102
Retirement Expense (depreciation)	.0274
Fuel for revenue vehicles	.0350
Lubricants revenue vehicles	.00374
Garage Employees	.00815
Garage Supplies and Expenses	.00171
Miscellaneous Transportation Expenses	.00015
Transportation Expense	.041
Traffic Expense	.001
General and Miscellaneous	.015
	17.485

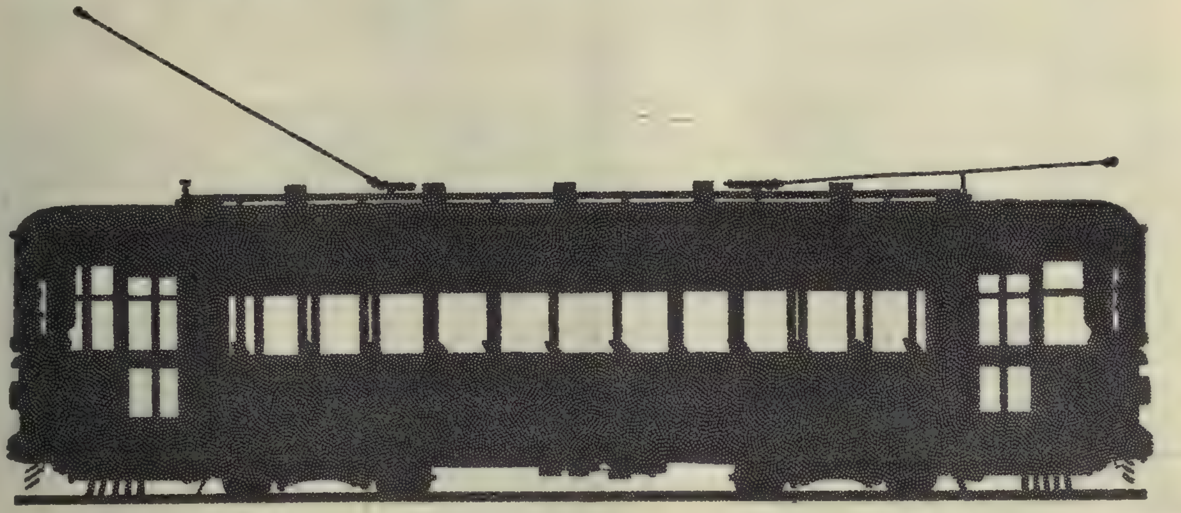
YELLOW COACH *plus* General Motors

stand ready to analyze *your* transportation problems and designate the type of equipment best suitable to your particular requirements.

Transportation experience and research combine with exceptional manufacturing facilities to assure low-cost, profitable miles.

YELLOW TRUCK & COACH MANUFACTURING CO.
SUBSIDIARY GENERAL MOTORS CORPORATION
5801 WEST DICKENS AVENUE, CHICAGO, ILL.

THE BACKBONE OF MASS TRANSPORTATION



NP

The street car has amply demonstrated that it will always be the backbone of mass transportation because—

> Its ability to handle peak load traffic with less occupation of street space and with general all around efficiency exceeds that of any other passenger vehicle.

Installation of the National Pneumatic Systems makes it possible to handle heavy traffic with the greatest speed, safety and comfort for the passenger and the maximum economy in operation.

National Pneumatic Company

Executive Office, 50 Church Street, New York

General Works: Rahway, New Jersey

CHICAGO
518 McCormick Building

MANUFACTURED IN
TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

PHILADELPHIA
1010 Colonial Trust Building

Thermit—
in Brooklyn

Thermit in Brooklyn, N. Y.

In 1923 the first Thermit Insert Weld went in, on the surface lines of Brooklyn. Since then over 11,000 Thermit Welds have been installed by the Brooklyn Companies which is ample proof of what they think of the results. These welds carry the load of a traffic procession equaled in few other American cities.

Brooklyn now uses Thermit Welds—exclusively!

Why? Because they've found that the first cost is the last cost—and it's far cheaper in the long run.

A quotation and full information costs you nothing. Ask for our figures on the next track-work job.

THERMIT

THERMIT

METAL & THERMIT CORPORATION
120 BROADWAY, NEW YORK, N.Y.

Building a new-day transportation system *in Alliance, Ohio!*

The Stark Electric Railroad has had its troubles during the past three years. Replacing the electric car service with buses proved a failure. The losses were heavy.

Yet the prospects of this road for 1927 are good. Car service has been resumed on improved schedules. Eight new lightweight interurbans, Cincinnati-built in accordance with the principle of BALANCED DESIGN, have already won high praise. And on these interurban cars ultra-modern improvements have done much to win back substantial public goodwill.

The photographs show how attractive the interiors of these new cars really are. Smoking compartment and toilet are provided, also such original details as telephones and hat check-boxes. Furthermore the seat coverings in the main compartment are of two-tone gray linen,—removable and washable.

Balanced Design has missed no tricks here. It has achieved cars of distinct character, coupled with sound operating efficiency under the conditions to be met.

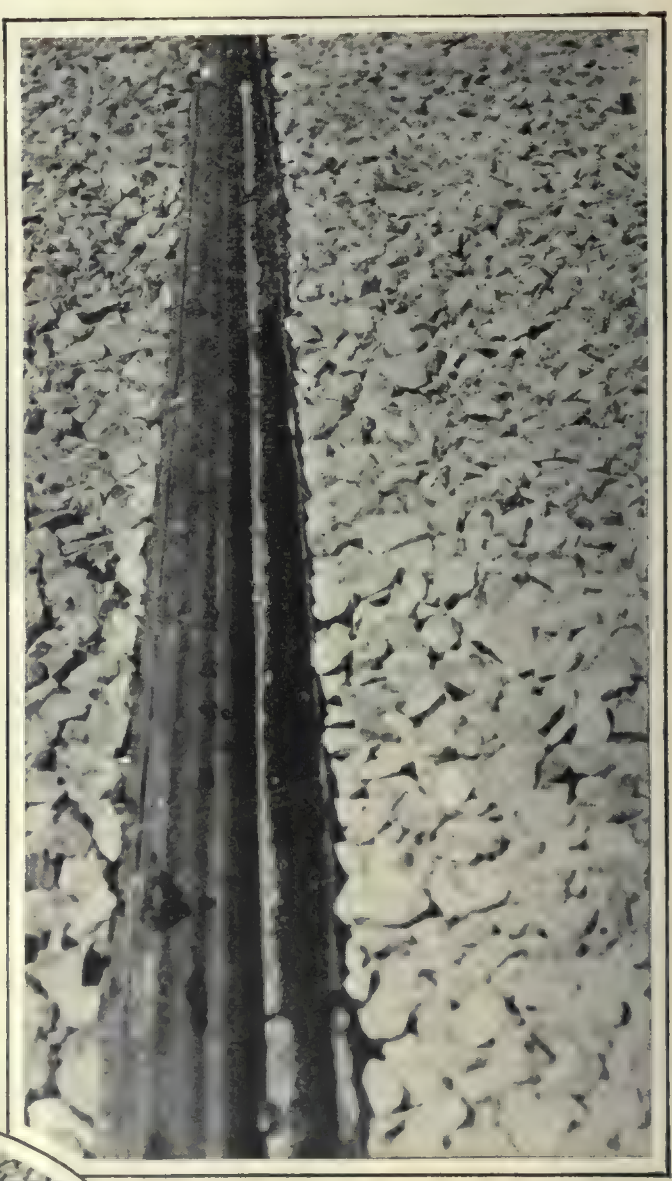
And BALANCED DESIGN can do exactly the same thing for you. May we enter into correspondence on the subject?

CINCINNATI *New* CARS

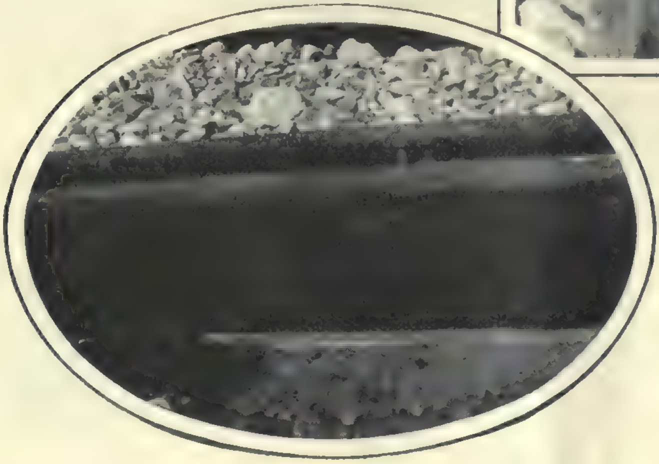
CINCINNATI CAR COMPANY
Cincinnati, Ohio

*A step ahead
of the
modern trend!*

"The street railway



Section of the track of the Evansville & Ohio Valley Traction Company, protected by Carey Elastite System of Track Insulation.



can hold its own with the automobile"

"FOR several years we have been hearing that the days of the electric interurban railway are numbered, due to the growth of motor vehicle transportation," said G. R. Millican, General Manager of the Evansville & Ohio Valley Railway Company, Evansville, Indiana. "But now the pendulum is swinging the other way.

"The use of motor vehicles, has, to be sure, enforced changes in electric railway transportation. But if the interurban railway adapts itself to the new situation it can hold its own with the automobile.

"On our lines, we have met the problem by using smaller and more comfortable cars, and by operating on faster schedules. We have discarded the 65,000 pound two-man cars and are using 32,000 pound one-man cars in their places. Since this change our passenger traffic has shown a 15% increase, due in part to our faster schedules. And for the same reason we have been able to handle this increased traffic with fewer cars than we formerly used. Our maintenance costs are lighter and our operating costs per mile much less. Besides, we have been able to give better service.

G. R. MILLICAN, *General Manager of the Evansville & Ohio Valley Traction Company, which serves several towns in the neighborhood of Evansville, Indiana.*

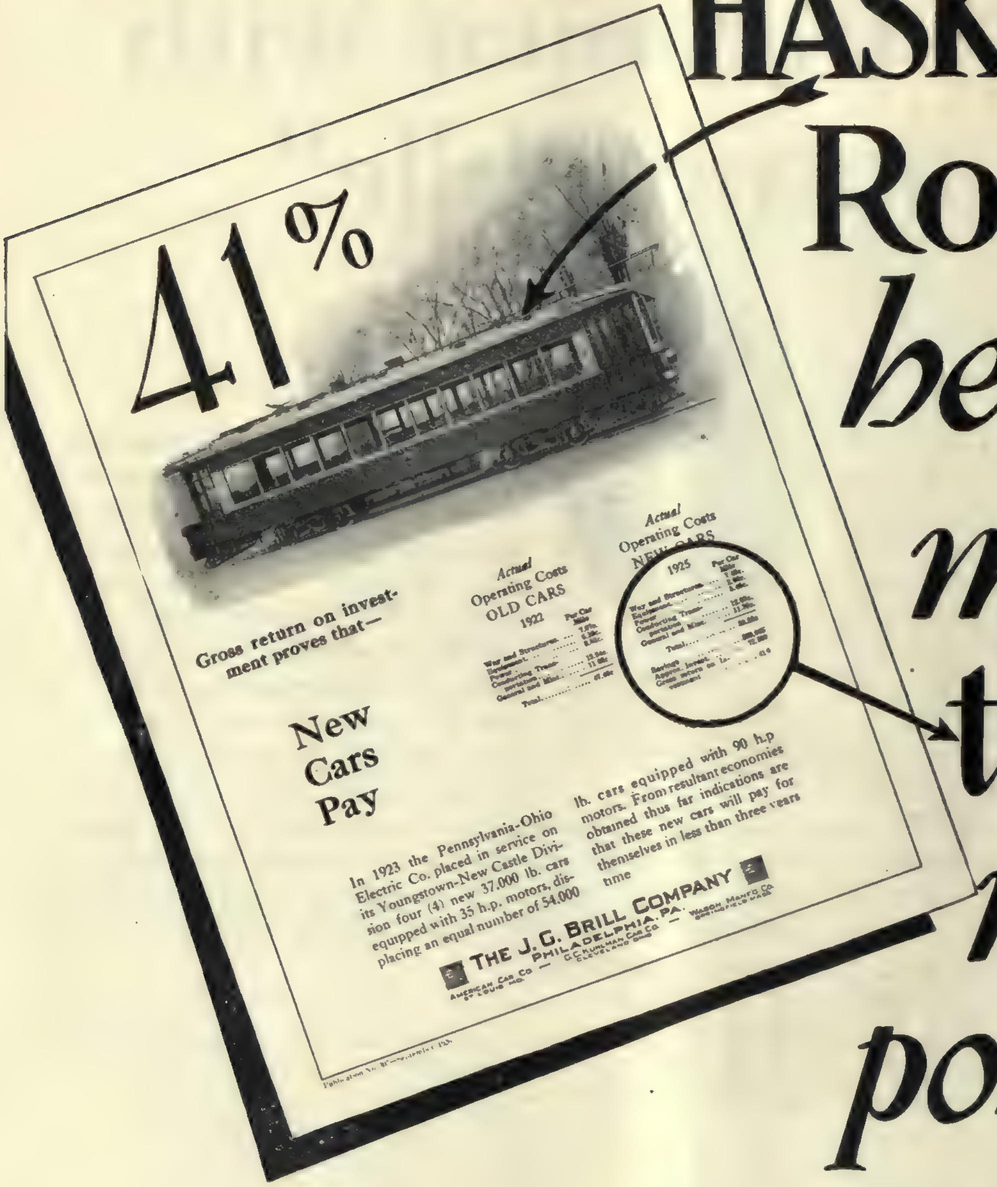
"When we want a first-class piece of track construction, we use an asphaltic rail filler on each side of the rails. In one of the small towns in which we operate we were able to overcome local opposition to needed changes in our tracks, by installing a rail filler job. We find it keeps the pavement in perfect condition."

In carrying out the construction work referred to by Mr. Millican, the Carey Elastite System of Track Insulation was used. This system has been thoroughly tested under actual service conditions and its use is recommended by leading street railway officials throughout the country. It protects the pavement, lessens track corrugation and reduces operating expenses.

THE PHILIP CAREY COMPANY
Lockland, Cincinnati, Ohio

Carey Elastite
SYSTEM OF
TRACK INSULATION

HASKELITE Roofs *helped make these records possible*



41%

Gross return on investment proves that—

Actual Operating Costs OLD CARS 1922

Actual Operating Costs NEW CARS 1925

New Cars Pay

In 1923 the Pennsylvania-Ohio Electric Co. placed in service on its Youngstown-New Castle Division four (4) new 37,000 lb. cars equipped with 35 h.p. motors, displacing an equal number of 54,000 lb. cars equipped with 90 h.p motors. From resultant economies obtained thus far indications are that these new cars will pay for themselves in less than three years time

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. — G. C. KUHLMAN CAR CO. — WASON MANF'G CO.
ST. LOUIS MO. CLEVELAND OHIO SPRINGFIELD MASS.

	Old Cars	*New Cars*	*Saving*
Maintenance of Equipment.......	6.19c. per car mile	2.66	57%
Power..........................	8.52c. per car mile	5.46	36%
Total Operating Cost..........	47.40c. per car mile	39.52	16.6%
Gross return on investment.....................			41%

A HASKELITE roof saves more than 100 lbs. in the weight of a street car. This material is equally valuable for use in floors, linings, seats, etc., and its armored companion, PLYMETL, saves approximately 300 lbs. as compared with steel plate for side panels. When HASKELITE and PLYMETL are used for all the logical applications in a modern car, the total saving in weight effected is over 900 lbs. At the accepted figure of 6c. per lb. per year for operating cost, this means an annual saving of well over $50 per year for every such light weight car put in service. As indicated above, these savings, combined with others possible in light weight car construction, will pay the cost of such equipment in a short time. Ask for detailed information on HASKELITE and PLYMETL.

Haskelite Manufacturing Corporation
133 West Washington Street, Chicago
Canadian Representatives:
Railway and Power Engineering Corp., Ltd.
Montreal Toronto Winnipeg

PLYMETL, steel faced HASKELITE, ideal for side panels still further decreases weight and decreases operating expense.

PLYMETL

ERJ2-5Gray

Modern Cars are noted for Comfort—

"Money spent for new cars has been a profitable investment in every instance where it has been intelligently applied." Mr. Willits H. Sawyer's words refer to improvements in service made possible by using new, modern, *comfortable* cars. Only cars that are attractive and comfortable will successfully compete with other modes of transportation.

Interior of interurban cars recently built by Cummings Car and Coach Company. Seating arrangement is a feature.

CUMMINGS CAR AND COACH COMPANY

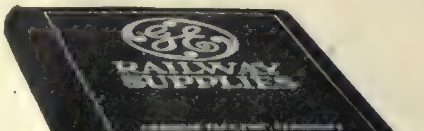
Successors to McGuire-Cummings Mfg. Co.
111 West Monroe Street
CHICAGO

Baltimore is convinced—3,000 in one order

The United Railways and Electric Company of Baltimore is installing 3000 G-E Renewable Carbonway Brush Holders in order to convert its motors to the renewable carbonway type.

This change will reduce brush holder maintenance, because now only the worn carbonway need be scrapped, while the more expensive part of the holder is preserved for further service.

With an 80% saving possible, can you afford delay in adopting this obvious improvement?



General Electric is continually developing new or improved products for electric railway service. Ask your G-E Railway Specialist to tell you more about this and other maintenance-reducing repair parts.

330-35

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

Volume 69 New York, Saturday, February 5, 1927 *Number* 6

Rapid Transit Subways an Economic Solution for Street Traffic

CHICAGO'S billion dollar transit plan improves with rereading. The material and theories presented warrant many readings. Besides being a good transportation plan it is a sound economic treatise on civic traffic relief. The abstract of the report presented in the Jan. 22 issue of this paper could but briefly touch the high spots.

Subways are ordinarily considered as a benefit to their patrons. They are. More than that, they are a benefit to the street surface users. One subway will provide transportation facilities for many thousand people who would otherwise use the overcrowded streets. Widening or double-decking of streets might accomplish the same thing, but with attending difficulties of approaches that are much simpler when accomplished by rail transportation. The cost of rapid transit subways is also materially less.

No one would think of burdening the car riders to pay for a double-decked street; more likely the riders or their company would be reimbursed for what costs might be involved in changing the rail structures to conform with the double-decking. Henry A. Blair, author of the plan, likewise argues that the cost of providing tubes for trains should not be added to the street car fare—neither the principal nor the interest on it. For the benefits derived by transit users—and they are important, indeed—the riders will absorb the cost of scrapping the superseded surface track investment and the construction of the new and costly track structures in the tubes. The company will provide capital for the track and equipment and the riders will pay for the operation of the trains and the use of the private investment.

Mr. Blair's arguments are materially strengthened in this position, since Chicago has already spent millions in providing more street surface for vehicles, at materially greater unit costs. Wacker Drive, for instance, cost $20,000,000 per mile and Michigan Boulevard $18,000,000 per linear mile of street gained. Subways are only another way of accomplishing the same thing, except for the important difference that they are materially cheaper. Also, as shown in the McClintock report on street traffic, they will serve more of the populace because 62 per cent of the people who enter the central district use the common carrier vehicles (except steam roads) and only 19 per cent private automobiles. The auto is more in evidence because of the great number of units, but the service it performs for individuals is quite another story. After all, it is the individual who must be benefited, not the vehicle.

Subway proponents should not be blinded to certain obvious disadvantages, both to the public and the operator. Many short-haul riders in the subway areas will unquestionably be lost. People cannot be induced to go down one or two flights of stairs to a car or train they know must be there but cannot see as they can on the street, only to ride a few blocks and then climb to the surface again. This is a loss the transportation system must bear as a part of the civic improvement and the benefit derived by the long haul and less profitable passengers.

With this thinking, subways as public improvements appear in a different light from that often observed. It is not a question of company welfare, because the users must pay in the end, but one of economics—a fair distribution of costs for the benefits derived.

Hesitating Before the Plunge

IN ALL sections of the country electric railways are repainting or refitting or rebuilding some of their equipment. Unfortunately, in many instances unwise things are being done. Expenditures ranging from $1,000 to $7,000 or $8,000 per car are being made to improve old equipment. With many of the oldest cars, although new paint and new seats and other improvements help materially, the rehabilitated cars are still heavy, clumsy and noisy affairs that fool nobody but those who lacked the wisdom and the courage to get rid of them. These are strong words, but they represent the judgment of a rapidly widening circle of forward looking operators who have given the subject careful thought, and who have made an unbiased analysis of the experience of those properties which have put on modern cars.

New cars are not a panacea. It has been said before that they will not take the place of good management. But they are a part of good management. They make many things possible that are impossible with heavy, clumsy, noisy and run-down equipment. It is easier to make a friend of the man on the sidewalk for the railway which presents the appearance of being progressive and up to date. It is easier to secure the co-operation and interest of employees on spick-and-span, modern cars which make them proud of their jobs than on dilapidated arks that sway and toss and groan and creak. Since the first step toward winning public friendship is to get the public interested in the railway, modern new cars help toward the solution of some of the industry's most pressing and baffling problems.

The general tendency to rebuild old equipment is a favorable sign. It is an indication of the rapidly growing and spreading realization of the need for improving the appearance, comfort and performance of electric railway cars. But in a sense the present situation is like that of the timid swimmer who cautiously tests the water before plunging in. The industry is interested, but it is still timid. There are many years of precedent to be overcome. It takes a high degree of courage and faith to send good money after bad unless there is a preponderance of evidence in support of such action. A new kind of thinking is being advanced. Somehow it is difficult for the average electric railway man to abandon the idea that a street car should be able to run forever. "It is a perfectly good car," he says. "Maybe it is a little bit heavy, but a coat of paint and some new seats will fix it up good enough to run many more years. These cars are too good to throw away." And so he paints and patches his twenty-year-old cars and then goes home to buy his wife a new automobile to replace the one he purchased three years before.

But the industry is thinking. It is beginning to ask itself pointed questions. It is beginning to realize that times are changed and that we have changed with them. It is standing on the brink of a new idea, but, like the timid swimmer who cautiously tests the water, it still hesitates. A little more testing is required; a little more experience on the part of those properties that have definitely gone ahead. Then we may expect to see the industry courageously striking out to put its equipment into shape to meet the need of modern times and modern demands.

Rule of Thumb Methods Will Not Solve Traffic Problem

CONTROL of street traffic by an extensive system of interconnected signal lights, all giving the same indication at the same instant, has proved extremely inefficient. This is because of the dissimilarity of conditions at different street intersections, where the volume of cross traffic varies greatly. With such a system the time intervals must necessarily be based on the needs of one particular intersection, so that they are entirely unsuited to the needs of other intersections having different characteristics. It is evident, therefore, that no such simple and easy plan will solve the problem of traffic control.

In New York City the Police Commissioner recently asked for $534,000 to install 800 additional traffic signals, following the same general plan that is now in use on Fifth Avenue and other longitudinal streets. It is proposed to synchronize vehicular movement over considerable distances on many parallel thoroughfares. Like some well-advertised patent medicines, these signals are expected by the municipal authorities to have a variety of beneficial effects, such as speeding up the vehicular movement, preventing accidents and reducing the number of traffic police required.

Curiously enough, one reason cited for extending the system is the tendency of automobile drivers to avoid the streets equipped with synchronized signals. Perhaps this is because the lights have speeded up vehicle movement until careful drivers are afraid to travel on these thoroughfares. One is inclined to doubt this explanation when it is remembered that the average speed of vehicles on Fifth Avenue, New York, excluding buses, is only 7 m.p.h., despite the use of the lights. In fact, engineering investigation indicates that synchronized signals have a definite tendency to slow down traffic.

So far as safety is concerned, the National Safety Council finds that simultaneous control offers no advantage over any other type of control. Thus reduction in the number of traffic police remains as the only desirable result achieved. If that be the object, it should be so stated, and the installation should not be made to masquerade as a means of speeding up traffic.

On the other hand, the "progressive" or "co-ordinated" plan, whereby the signal lights change according to the requirements of traffic at the particular intersection, rather than all changing simultaneously, has proved to be extremely efficacious in speeding up traffic. The installation on State Street, Chicago, is an outstanding example of the successful application of this principle. The speed of vehicular movement has been increased more than 25 per cent since this system has been in use. Rather than spend huge sums to provide more lights of a simultaneous type, New York and other cities contemplating similar installations would do well to study the methods used elsewhere, and profit by experience already obtained.

A Humanitarian Movement That Pays Large Dividends

FEW are the accomplishments in the street railway industry that can be of more benefit than a reduction in the number and seriousness of accidents. On any property it will result in better service because of lessened delays, in more economical operation because more of the gross revenue is retained as net and, last but not least, a reduction in the amount of human suffering.

Accident prevention, then, must be looked at as one of the most desirable ways of improving the operation of a system. Every company should be interested in the subject, and should do its share in finding ways of minimizing losses of this character. The Claims Association and the Transportation & Traffic Association are both doing excellent work in studying the prevention of accidents rather than in minimizing the loss after one has occurred.

The efforts of these associations are in large measure confined to the industry. Work of a similar character, but on a scale to interest the whole nation, is being carried on by the Electric Railway Section of the National Safety Council. The effectiveness of this work depends in large measure on the size and quality of the membership and the interest taken by the individual representatives. The last convention of the council showed that interest is not in any sense lacking. The subjects were live and the discussions were good.

The membership, on the other hand, is not nearly so large as the importance of the subject justifies. Statistics show that only 128 electric railway companies, or about one-sixth of the total number of active operating companies, have membership in this body.

In view of the vital character of the council and the wonderful possibilities in getting the results that are to be obtained, every company should see if it can afford not to be connected with this movement.

A Lot of Shucking, but Mighty Little Gain

"DYAR'S er monst'us mess o' shucking, but er mighty little grain," the quaint philosophic refrain to a negro dialect poem, is pertinent to the present transit problem now before the citizens of Greater New York. In the light of the predatory shucking operations of a certain political group at Albany, it seems safe to predict that if there is any grain it will be in the nature of corns on the feet of millions of citizens now called upon to put up with inadequate and insufferable transportation conditions.

Perhaps the most alarming phase of the problem at present is that of the public paying too much attention to the bus franchise controversy between Mayor Walker and the Board of Estimate and, as a result, neglecting the main issue, an issue so fundamental that it makes New York's problem a national one. Unbiased experts see no cause for alarm in delaying the franchise awards. Such action will undoubtedly result in good for the traveling public in the matter of safety, adequate seating facilities, lower fares and, more than likely, greater revenue to the city.

They are, however, deeply concerned that the people should neglect the solution of the main issue—more subways—which is threatened with annihilation in the present Legislature by the refusal of a political group to allow the people a voice in the extension of the city's debt limit. By so doing it is patent that a minority can rule, that it can destroy a rock-ribbed political axiom of the republic. In other words, it can shuck for the silk and not the grain. This brings one back to the assertion that New York's problem is a national one, for its roots are in the inertia of the people at the time of expressing their will, *per se*, when the polls are open. The people are, have been and always will be the reformers of the world, and as they sow so shall they reap. If they refuse to vote, or, what is far worse, vote unintelligently and under the spellbinding influence of selfish political promises, they must be prepared to be twiddled around the thumbs of petty politicians.

Talking Trainmen Can Do Railway Much Harm

WOMEN as a sex are usually credited with doing harm by too much talking, but men also are frequent offenders—particularly those railway employees who come into most frequent contact with the public—the trainmen. Sometimes it is just a slight grudge the man has against the company that causes him to grumble in the presence of passengers. In other cases it may be nothing more than natural garrulousness. But no matter what the reason, it always creates a bad impression when an employee tells the world what he believes to be wrong with the company and how much better things would be managed if only he had his way.

Seldom is the management in ignorance of this habit of certain employees to talk too much. Before long it is bound to reach the ears of those in authority. It is not easy, however, to know just how to handle such cases.

No management is perfect, and an experienced and thoughtful employee often is able to see ways in which service can be improved. If he is encouraged to impart his ideas to his superiors, he will be less inclined to unload them on the public. When the adoption of a suggestion is impracticable, the reason should be carefully explained to the man. Should he continue to feel seriously at odds with the policy of the company, his only proper course is to leave its employ. It is indefensible for a man to remain on a payroll who criticises company methods at every opportunity.

Undoubtedly the best way to forestall such talk is to give employees full information about the affairs of the company. The old conception that the relations of employer and employee were those of master and servant has largely passed away. Progressive railway managements have come to regard their employees as copartners in a joint enterprise. As such they have a real interest in the company's affairs and deserve to be given all possible information about its operation. Where this policy has been adopted, as in the case of the Pittsburgh Railways, for example, it is meeting with conspicuous success.

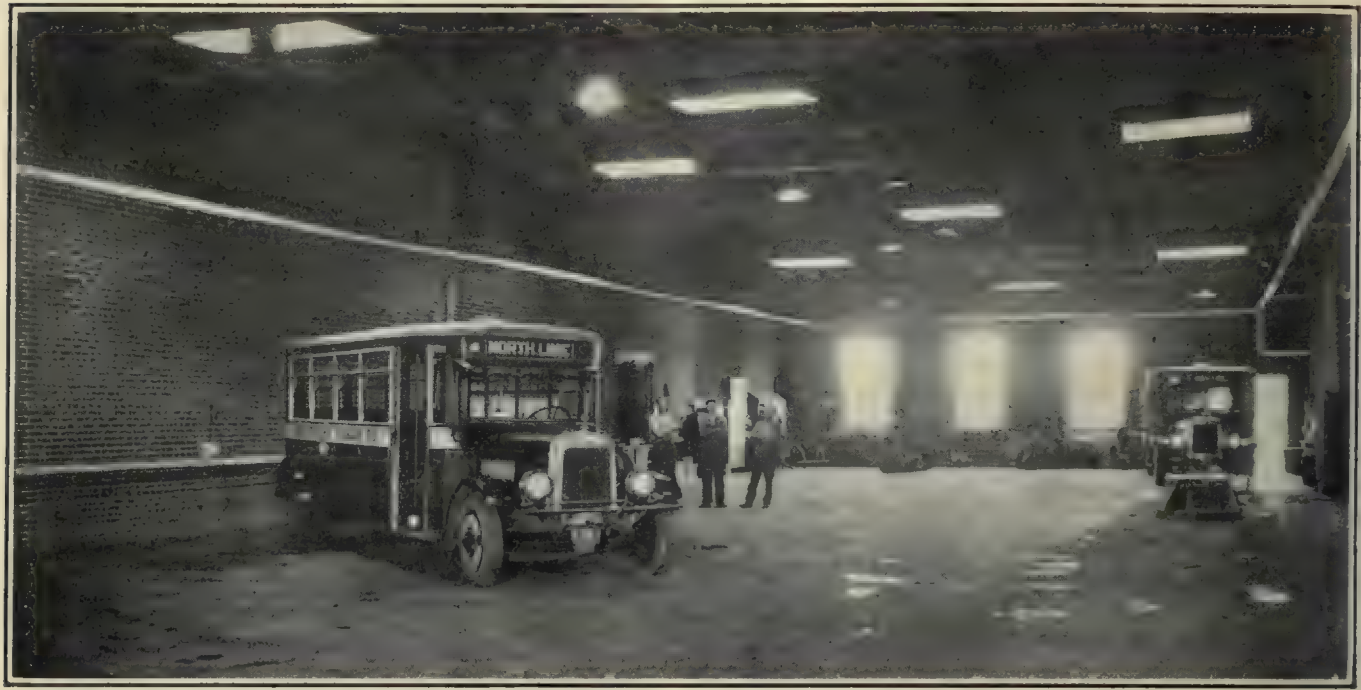
Surely This Kind of Death Is Not a Necessary Evil

"THERE is no class of taxpayers in New York State so heavily burdened by taxation as the street railways." Had an electric railway man said that it would have been regarded as vicious propaganda. A railway man did not say it, but the last man in the world who would be expected to do so. That man is none other than John J. Merrill, the tax gatherer himself. He is supposed to be impersonal in his point of view, and he is. But his alacrity in office as a member of the New York Tax Commission to gather the uttermost farthing has not blinded him to the inequity of a system that takes away from the electric railways $2,500,000 in taxes as paving. That in itself is an anachronism. As Mr. Merrill pointed out in a public speech, street railways pay a property tax on all property, 1 cent on every dollar of gross income, and in addition to all that a franchise tax.

The recital is particularly interesting because of the source of the remarks. Perhaps even more important is the picture which Mr. Merrill has drawn of the taxes paid by some others toward the support of state government.

The question is ever recurring. "Taxing the Utility" as discussed by Prof. E. R. A. Seligman before the committee on taxation of the American Electric Railway Association was the subject of an article in the JOURNAL for Jan. 29. Professor Seligman's talk was, of course, more specific than was Mr. Merrill's, but it had a different object. Professor Seligman made a plea that the utilities get behind the gross-net tax and do away with all the absurd things in the laws today, including the special franchise tax. In his opinion, if the utilities did this, and approach the subject fairly and loyally they would be able to help solve both the state and the local tax problem and at the same time achieve something that will ultimately redound not only to their own benefit but to the prosperity of the community as a whole. Talking to different audiences, the methods of approach to the subject by these two men had to differ. Professor Seligman does not lack the power to present facts concisely, but it fell to Mr. Merrill's lot to galvanize the facts into life. No one will deny that he did that.

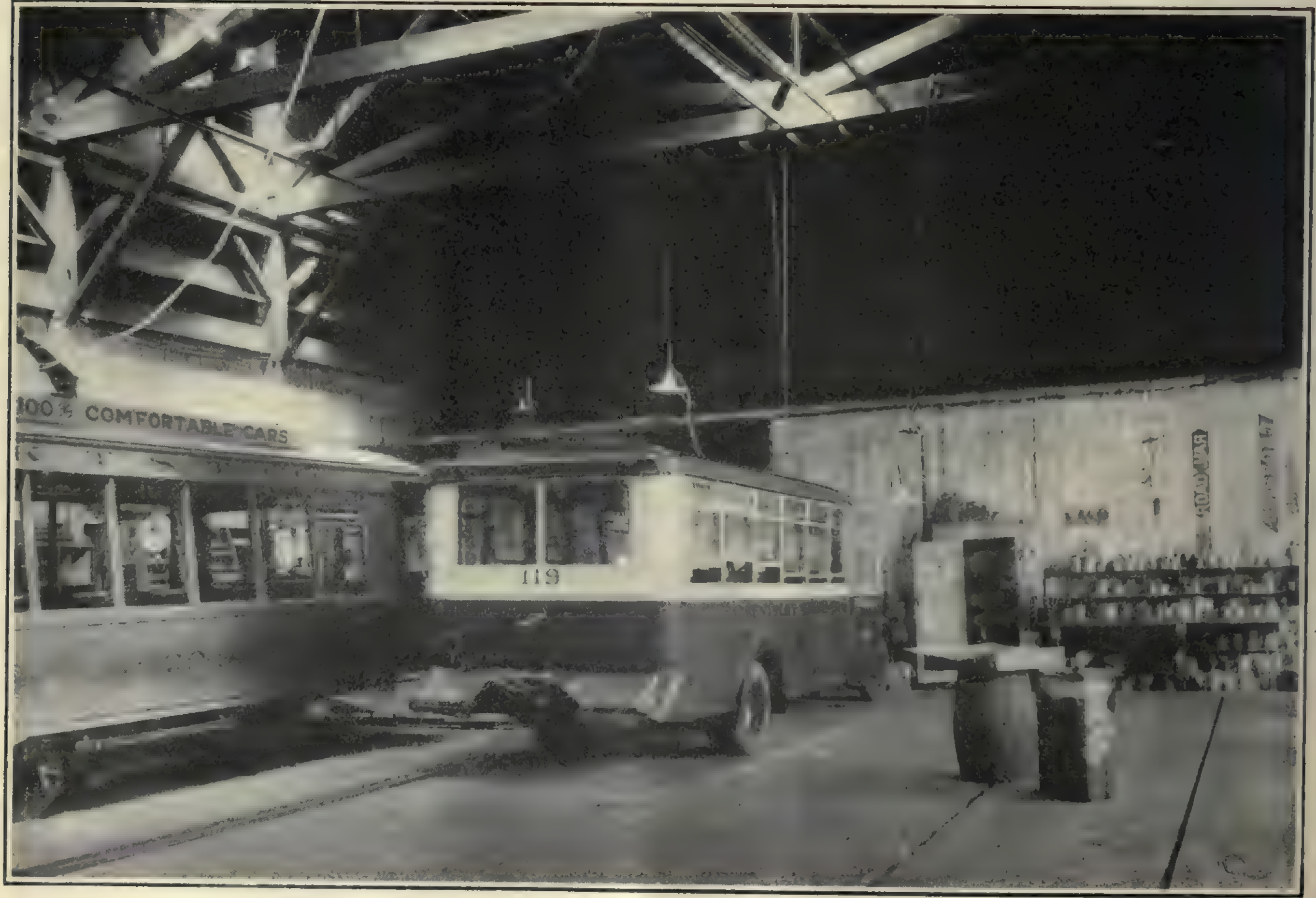
There are apparently no limitations on the use to which the electric railways may put the facts Mr. Merrill and Mr. Seligman have so concisely stated for them. They have given the railways most valuable ammunition. This paper is glad to print the remarks and call the attention of the industry to them. While it is decidedly unpleasant to the electric railways to be reminded by Mr. Merrill that "electric railroads are being taxed to death," particularly when these remarks are so close an approximation of the truth, the legitimate use that the industry makes of these statements in its own behalf will bespeak the extent of its courage to battle for the right for itself and, more important still, for its own patrons. One may still agree with Shakespeare's sentiment that death, a necessary evil, will come when it will come, but death by external strangulation is hardly a necessary evil, supinely to be endured.



Arrangements for Handling Car and Bus in Lexington, Ky.

Above is the interior of the main garage, with two of the Yellow 21-passenger buses. At the right is a pit. Since the photograph was taken the pit has been lengthened and an additional inspection pit constructed.

Below is shown the paint shop, where trolleys and buses receive "appearance" treatment. A White-Kuhlman bus is seen in process of refinishing.



Adjacent to the car shops, this 50x90-ft. garage was available and put in order for bus maintenance. The wooden building at the right is an overflow storage shed.

The Five Fundamentals of Co-ordination

Lexington, Ky., Property Evolves Working Definition—Encouraging Growth in Trolley Riding Even During Periods When Number of Buses Is Greatly Increased

By R. E. Plimpton

Associate Editor Bus Transportation

"WHAT is co-ordination?" is a question that is being given a practical answer in the city of Lexington, Ky. With less than 50,000 all-year inhabitants, this center of the breeding of blooded stock for horse racing, of the largest burley tobacco warehouses in the world and of at least half a dozen institutions of higher learning has kept up an encouraging growth in trolley riding and revenue. At the same time there is being developed a bus system which while not yet profitable in itself gives every promise of being so as operating experience is gained and practicable buying economies are put into effect.

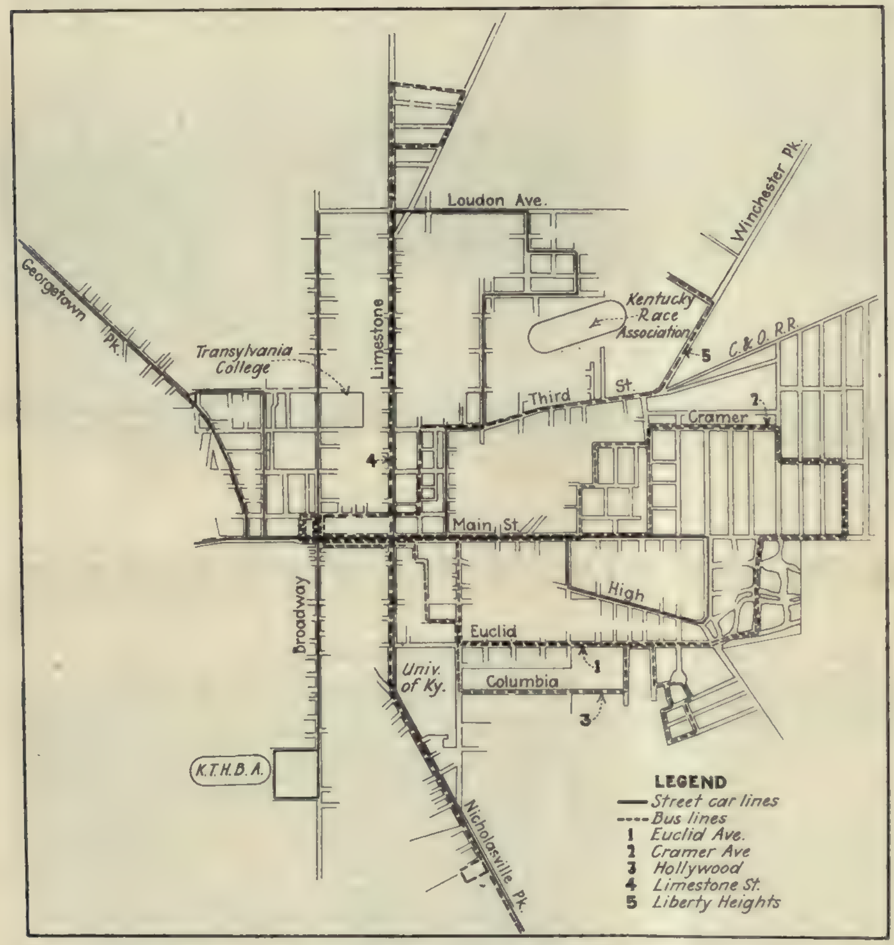
The Kentucky Traction & Terminal Company and its subsidiary, the Kentucky Coach Company, are now in a position to say that co-ordinated transportation is a fact in the city of Lexington. To secure the present non-competitive operation in local transportation a long process of education has been necessary, but at present the people of the city and its government seem to be convinced that better service can be given under the one management. It is felt also that the traction company has done the fair thing in buying out certain of the small operators who had previously made a hand-to-mouth living, often on routes directly paralleling the trolley line.

With these underlying problems settled, for the time being at least, the company has gone ahead really to practice co-ordination based on the following five fundamentals:

1. *Organization* — A subsidiary company operates buses on account of certain legal requirements, the bus work being taken over largely by the trolley staff.
2. *Routes.*—The new bus lines dovetail to supply unserved territory, with the exception of one case where parallel routes are necessitated by special conditions.
3. *Schedules.*—Service alternated in the one instance of parallel routes with "loop" layouts adopted for other bus lines. On two of these lines service given on the loop in both directions.
4. *Facilities.*—New garage building put up adjoining trolley car repair shop. Machine tools, blacksmith, woodworking and painting facilities of car shop used for bus work.
5. *Equipment.*—Experimental work to adapt practice in trolley construction to the motor bus and incidentally to develop worth-while automotive ideas in connection with trolley car construction.

NEW DUTIES, OLD ORGANIZATION

The Kentucky Coach Company, formed early in 1925 when bus operation was started, is a subsidiary of the International Utilities Corporation, the holding company, which also owns and controls the Kentucky Traction & Terminal Company, the Lexington Utilities Company, operating the electric light and power interests in Lexington and the surrounding territory, and the Lexington Ice Company, operating two ice and one cold storage plants in Lexington. Officers are practically the same for the four companies, with J. P. Pope vice-president and general manager of each local company. It was a simple matter for the various administrative and operating departments to take over the new bus work. The superintendent of transportation, H. Bush, has direct charge of bus and railway operation, being assisted by one timekeeper and starter, one road supervisor and one inspector. Each of these officials gives the same attention to both forms of transportation, supplying change for all bus and car operators, putting equipment out on time, instructing operators and riding on the vehicles periodically. In like manner, the motor truck operation of the company furnished the nucleus of mechanical talent, which has been placed under the superintendent of equipment, W. G. Stuck, with a master mechanic as assistant in direct charge of trolley and bus maintenance. One working bus foreman was added this year, when the fleet was practically quadrupled in size by the purchase of new buses. The same force handles the cleaning of the two forms of vehicles, this being simplified because the plush covering for seats, standardized years ago for trolley cars, has been adopted for the bus seats.



Practically Every Section of Lexington, Ky., Is Served by the Two Forms of Transportation Operated by the Kentucky Traction & Terminal Company and by Its Subsidiary, the Kentucky Coach Company

ALL BUS ROUTES BUT ONE SERVE NEW TERRITORY

The Euclid-Cramer routes, started in the spring of 1925, pass through one of the finest residential sections of Lexington. While these are shown on the map as one route, buses are operated around the loop in both directions. On the "loop" part the streets followed are a considerable distance from any trolley line, thus serving a territory that entirely lacked public transportation. The Hollywood route, started in January last year, also keeps clear of any trolley line. This is not the case with the service on Limestone Street, an important through artery, where bus and trolley run parallel except for the diverging loops shown near the northeastern border of the city. On this street bus service has been given previously by a small number of independent operators, and for policy reasons and as a contribution to public relations it was deemed best to continue the two forms of transportation.

Approximately seventeen - hour service is given on both bus and trolley. In general the basis is a fifteen-minute service, with a ten-minute service on the peaks. Lexington is a "home to luncheon" city, so that there is a noon as well as morning and evening rush period. Frequent service, so desirable in the smaller cities where competition is often with would-be walkers, is obtained on Limestone Street by alternating bus and trolley. The bus headway is shown in the accompanying table, but on account of the method of operation on Limestone Street the public gets a six-minute service during off-peak and a five-minute service during peak periods.

Similarly, the Euclid and Cramer lines are staggered so that the headway out of the downtown terminal is 7½ minutes during the off-peak period and five minutes during peak periods, with the same headway at the far end of the loop. As is indicated in the table, on all lines ten buses are required for base service and fourteen for the peak requirements.

To house the buses a 50x90-ft. garage which happened

CO-ORDINATED BUS ROUTES, LEXINGTON, KY.

Route						Headway, Minutes		Buses Operated	
No.	Name	Date Started	Round Trip, Miles	Round Trip Running Time, Minutes	Lay over, Minutes	Base	Peak	Base	Peak
1	Euclid	4-6-25	5.2	27	3	15	10	2	3
2	Cramer	4-6-25	5.2	27	3	15	10	1	3
3	Hollywood	1-11-26	5.2	27	3	15	10	2	3
4	Limestone	9-1-26	6.9	38	2	12	10	3	4
5	Liberty Heights	9-18-26	4.2	25	5	30	30	1	1

to be available across the street from the trolley carhouse was bought. This was remodeled last year with installation of large doors, skylights and a drainage system, about $6,000 being spent to put it in good working order. Following the purchase of new equipment last year a small frame structure, which is shown in an accompanying illustration at the right of the main garage, is also being used for storage. Heavy repair equipment already available in the trolley shops is, of course, utilized to the fullest extent. All the machinist work is done in the car shops, where blacksmithing and welding facilities are available. Air from the railway air compressor supplies the garage, and body repairs and repainting are taken care of by the same force and with the same facilities. One of the illustrations shows the paint shop with a one-man trolley car and a 24-passenger bus side by side.

ROLLING STOCK

In introducing the new bus equipment many of the details of construction found satisfactory with the trolley have been adopted. For example, all the seats are finished in plush, a material which has proved extremely satisfactory for the local conditions after many years use in city and interurban electric cars. Another novel feature is shown in an accompanying illustration. This is the use of a front fender on buses. It is the invention of F. W. Bacon, president of the Kentucky Coach Company and vice-president of the Kentucky Traction & Terminal Company. The fender is arranged so that it is tripped automatically when it strikes an object or the driver can drop it or lift it up by a knob placed at the side of the steering wheel.

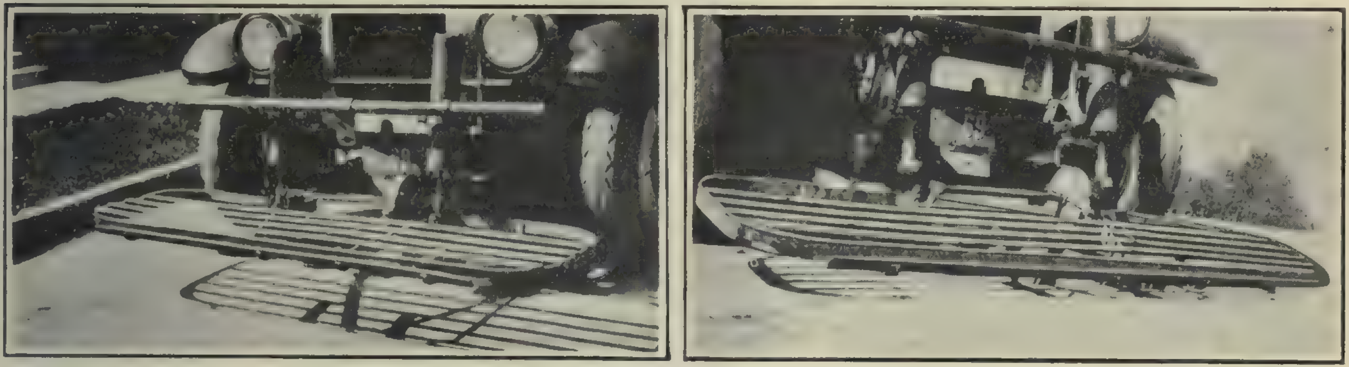
The idea of co-ordination is carried out in the fare arrangement, the rate being 7 cents cash, four checks for 25 cents, on either car or bus. A universal transfer system from car to bus and vice versa is in effect. At present about 66 per cent of the passengers on the buses use the checks, as against 57 per cent on the trolleys. This difference is due, it is said, to the fact that whites only are carried on the buses, while the trolleys carry colored people as well as whites.

On this fare basis the business has grown until the buses are carrying around 140,000 passengers a month, as compared with 400,000 on the trolleys. Income from buses during 1926 will be about $110,000, it is estimated, while the trolleys will bring in nearly $250,000. Annual mileage covered during 1926 was about 657,000 for the buses and 1,050,000 for the trolleys. Route mileage is 11.3 and 18.6 for the two respectively, these figures being based on half the round trip mileage, which includes the distance covered on the loops. The bus equipment includes a total of 444 seats, as compared with a total of 812 on the trolleys, the latter representing 29 one-man cars, each seating 28 passengers. Five makes of buses are used, five 24-passenger Whites, eleven 21-passenger Yellows, five 15-passenger Reos and one 17-passenger Graham.

At present the bus growth is greater than on the trolleys, a recent month showing a 40 per cent increase in riding, as compared with the same month last year, while the trolley riding went up only 10 per cent. This is accounted for by the addition of a number of buses in April of last year. In fact, the number operated has been practically doubled over a year's time. In view of this the trolley showing is very encouraging.

Taking the figures for the last six months of 1926, the traffic was about 175 rides per inhabitant, not at all a bad showing for a city roughly 3 miles and 4 miles across on its main axes. Of these 175 rides per inhabitant, about 60 were taken in the buses. For the first six months of 1926 the bus operation showed a total accumulated loss of close to $10,000, although the increase in bus business lessened the loss considerably in the second half of the year. As against this the trolley part of the business is practically breaking even. It is expected, however, that when possible buying economies are put into effect and increased experience is gained in maintenance a much better showing will be made with the buses.

The officers of this company are strong believers in weight reduction and think that the manufacturer should apply a lighter vehicle and therefore one less expensive to operate, without any sacrifice in strength or durability. Another result they are working to obtain is the transportation point of view among their automotive maintenance force. It has been found that the average automotive mechanic is more efficient in replacing parts than in locating and eliminating trouble. Hence, the effort is being made to imbue these men with a new conception of the purpose of inspection.



Fenders Are Used on the Lexington Buses, Being Controlled by the Driver. The Views Show the Fender in the Up and Down Positions

Capacity of Traffic Lanes

SPEAKING at a meeting of the American Society of Civil Engineers on Jan. 5, Arthur Tuttle, engineer of the Board of Estimate, said that on the proposed marginal highway in New York City there would be six lines of vehicles and that each line would have a capacity of about 1,500 vehicles per hour. He added that there was no street in New York at the present time in which the maximum number of vehicles moving past a given point reached as many as 900 per hour per lane.

An Excellent Restaurant and Lunch Counter Run by the North Shore Line Is Located in the Rear of the Street Floor of the New Station

Looking Toward the Front on the Street Floor of the North Shore Station. Finish Is in Marble and Walnut with Brass Fixtures and Fittings Inclosing the Ticket Office

North Shore Opens New Station

Interurban Line Between Chicago and Milwaukee Has a New Station in the Chicago Loop, Reported to Be the Finest of Its Kind—Serves Trains Operated Over Elevated Tracks and Companies' Bus Operations

SUPERIOR accommodations are afforded to patrons by a new station of the Chicago, North Shore & Milwaukee Railroad in the Chicago Loop district which embodies decorative features that make it one of the finest interurban stations of its kind. It is located at 223 South Wabash Avenue, only a few doors south of the location of the former station.

Passengers enter and leave the main floor directly from the street. Ticket offices, check room and restaurant are on this floor. The interior finish is marble and walnut with brass fixtures, presenting a most pleasing ensemble. Broad stairways lead to the upper or train level and to the men's smoking room in the basement.

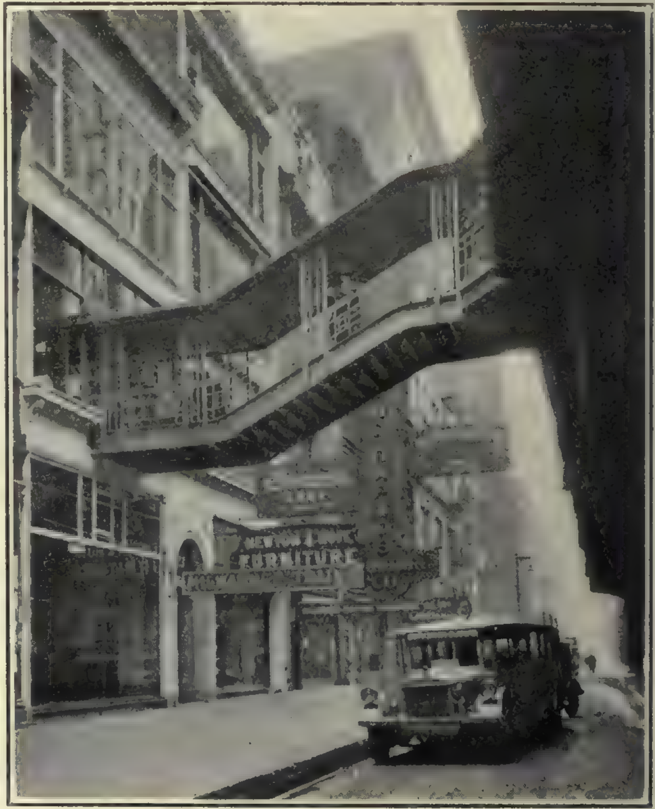
The second floor is given over in part to a waiting room. A bridge connects this with the Adams and Wabash "L" station, where patrons board the North Shore trains for Milwaukee and intermediate points. For convenience, additional ticket windows are provided. At the rear of this floor are show windows in which are attractive displays of household furnishings.

Walnut benches are provided on both floors for passengers waiting for trains. In addition, a women's waiting and rest room is equipped with luxurious period furniture.

A feature of the new quarters is a system of electric amplifiers through which train departures are announced so that they may be clearly heard in all parts of the station.

A. U. Gerber, architect, designed the new quarters, completely remodeling the old interior. The station has excellent lighting facilities. Illuminated signs direct customers to all points of service.

The restaurant and lunch counter are operated by the North Shore Line, being installed under the direction of P. F. McCall, manager of commissary. The kitchen is equipped with the most modern cooking appliances. The station will serve as a model in future development of North Shore Line terminal facilities.



New North Shore Station on Wabash Avenue in Chicago Connects Directly with the Adams and Wabash "L" Station

On the Mezzanine Between the First and Second Floors of the New North Shore Station Is a Sumptuous Lounge Room for the Women Patrons

Saginaw Revives a Dead Service

Once Discredited, the Street Car, as a Means of Local Transportation, Has Come Back with a Punch in the Michigan City—Intensive Advertising and Distinctive Painting Important Features of Campaign Waged by Railway

Distinctive Color Schemes Were Combined with the Naming of Cars for Various Local Organizations in Cultivating Public Approval of the Street Car Service

WILL the average rider take a personal interest or pride in the transportation facilities of his city? Will he respond to an appeal for his patronage? Does he actually realize what transportation convenience means to him from a dollar and cents point of view?

The foregoing questions sum up briefly what Charles S. Kressler, president and general manager of the Saginaw Transit Company, Saginaw, Mich., had in mind just before he inaugurated the present scheme of merchandising his electric railway and bus service.

Slowly but surely the progressive policies instituted as a result of these rider psychology questions brought results that proved beyond doubt that a dead service can be revived despite the worst obstacles. In the first place, it was necessary to rekindle interest in street car riding after a lapse of time during which motor buses had completely dominated and then lost public favor through disorganized service. This situation had created the habit of private automobile use for business purposes as well as a public willingness to give free rides to those who desired them.

Secondly, it was necessary to drive out of the average rider's mind the impression that public traction service was monotonous and impersonal in comparison to the freedom of a private automobile. These features typified the most important sales resistance offered to the street railway property. Its service was of a sound nature, and yet it was thought that the public fancy could not be intrigued by this alone, but through some other merchandising method that would keep the subject of transportation favorably impressed in the minds of the riders and lead to their steady patronage. For this merchandising campaign was enlisted the printed word carried in company advertising placed in a leading newspaper and several other mediums reaching different classes of riders. The message conveyed in each piece of advertising copy brought home forcefully facts of which the average rider was perhaps not cognizant and, in addition, convinced him of the value of the service given.

In a number of the advertisements the theme of the message was designed to prove to the rider that private automobile operation was far more expensive to him than the moderate fare charged on either the street car or the bus. How potent this educational work alone proved is illustrated by the decrease of at least 50

Why is it that you Live on or Near a Car or Bus Line?

ISN'T IT BECAUSE YOU CONSIDER SUCH A LOCATION ADDS VALUE TO YOUR PROPERTY?

ISN'T IT BECAUSE A WELL ORGANIZED TRANSPORTATION SYSTEM (SUCH AS IS ENJOYED BY YOU) IS ONE OF THE GREATEST ASSETS A CITY CAN HAVE?

Are You Doing Your Part in Riding the Cars and Busses to Make Your Transportation System a Success?

Saginaw Transit Company

"Your Transportation System"

One of the Typical Sales Appeals Made Through the Advertising Columns of a Newspaper

per cent in the number of parked automobiles at one factory. Formerly this factory yard was overflowing with cars.

For a long time after the street car system was revived the revenue from school children was considerably below the potential possibilities. The habit of begging rides continued and served as a bad example to other classes of riders, such as those going to the trade school and the naval reserve training station. Through steady advertising in the high school paper and by painting one of the cars in the distinctive yellow and black school colors school revenue picked up immediately.

Start the day right, by going to School on the street car.

◆

Saginaw Transit Company

Your Transportation System

The Importance of School Patronage Was Recognized by Space Taken in the High School Publications

The same distinctive color plan was worked out on cars covering the trade school and naval reserve routes. These appeals to rider pride were soon developed to encompass the Boy Scouts, Girl Scouts, the American Legion and the 32d Division.

The plan has also been adopted of identifying the car operator through the use of a nameplate prominently displayed in the front vestibule. In abolishing number identification the company feels that it has made just one more stride toward implanting the necessary personal touch in its service. In this case the riders soon acquire the habit of greeting the operator by name when boarding the car in the morning or evening and subconsciously connect the service given them with an individual rather than with a cold, inanimate public carrier.

In September, 1925, the company decided on a fare increase from four rides for 25 cents to three for the same price. In order to determine what the riding public thought of the plan, a general vote was taken. A majority of 60 per cent decided in favor of it. The decrease in revenue immediately after the fare increase became effective was small and soon afterward the increase in gross receipts crept up to a little above 20 per cent.

What Your Car Ticket Does---

It places at your immediate service a $6,000 to $8,000 car—a car that in winter is closed and heated as comfortable as your home.

This car is operated by trained men and you sit back in comfort while they take you through traffic safely and quickly. It is always ready and running whenever you wish to use it. You do not have to worry about having it stolen, or damaged by careless drivers; you do not have to provide it with garage or gasoline.

If you go to the theater at night or shopping in the day, you have no difficulty getting to the entrance of store or theater.

The company provides extra cars for extra crowds, and when you come out of the theater your car is waiting for you.

Every ticket you buy is helping maintain Your Transportation System, something that is most vital to the future success and development of your city and your own prosperity.

Remember the street cars and busses have earned your consideration and deserve your support.

The Saginaw Transit Company

Your Transportation System

Good Public Relations Established by Presenting Salient Facts to the Public Concerning Transportation

Whether the foregoing increase resulted because of the color plan cannot be accurately determined, but it apparently did play an important part, as this plan was started in October, a month after the fare increase went into effect. What the company has accomplished since 1923, when it started operating, until January, 1926, is shown by the traffic statistics. In December, 1923, 14,273 passengers were carried; December, 1924, 20,309 passengers; December, 1925, 23,938 passengers, and in January, 1926, 26,000.

Trainmen's Timekeeping Simplified in Twin Cities

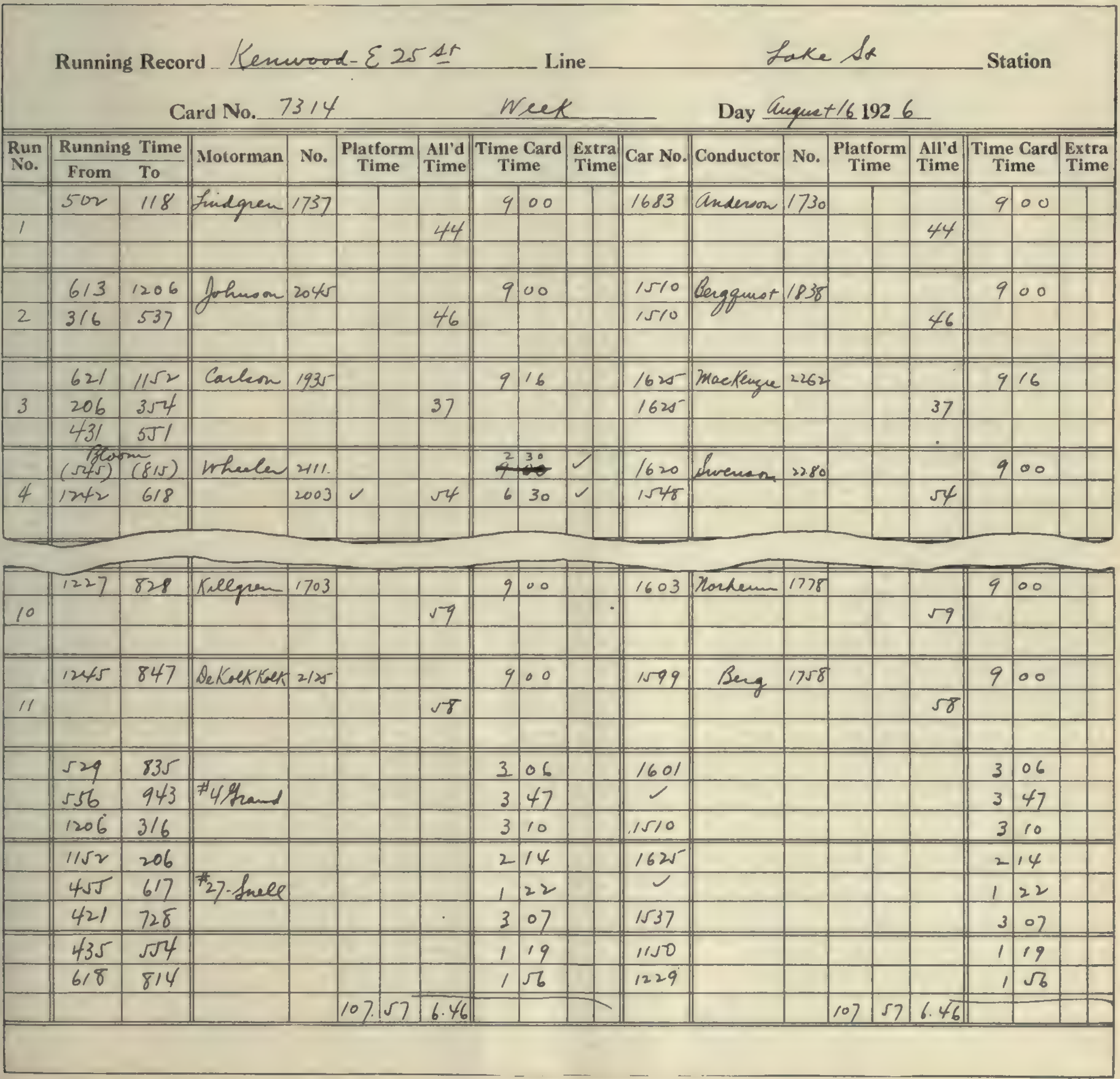
Half of the Time Clerks Saved—Time and Payroll Based on Schedules and Variations Noted to Get Final Figures

PREVIOUS to the change made recently in the auditing department of the Twin City Rapid Transit Company it required twelve clerks to keep the trainmen's time and make up the payroll. With the old method a clerk was required in each car station to make up a time sheet each day from the trip sheets turned in by the conductors, which also included the motormen's time. These time sheets from the six operating car stations were sent in daily and it required six women clerks to post the time, check it with the schedule and to transfer each day's total to the payroll sheet.

Upon studying the actual procedure in this work, it was found that 90 to 95 per cent of the daily work performed was exactly according to schedule and that the only variations occasioned by sickness, allowed time off, traffic tie-ups or other unusual procedures amounted to but 5 or 10 per cent of the total entries necessary.

PAYROLLS MADE UP IN ADVANCE

In accordance with the new plan now in effect on the system the daily time sheet is written once with duplicator ink and fifteen or sixteen copies made, sufficient for the two weeks payroll period. One of the sheets reproduced herewith is for the Kenwood-East 25th Street line, operating out of the Lake Street station. There are eleven runs and eight trippers.



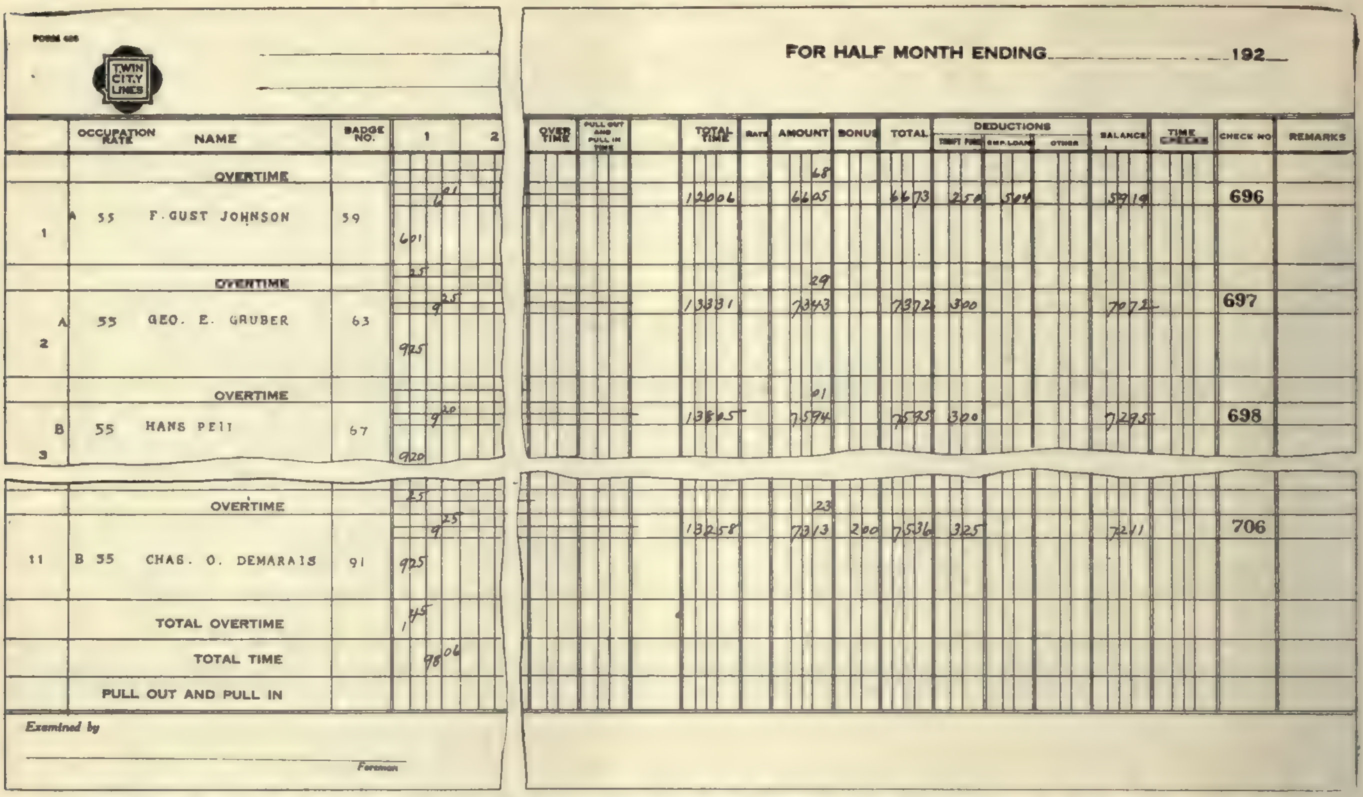
Running Record Kenwood-E 25 St Line Lake St Station

Card No. 7314 Week Day August 16 1926

Run No.	Running Time From	Running Time To	Motorman	No.	Platform Time	All'd Time	Time Card Time	Extra Time	Car No.	Conductor	No.	Platform Time	All'd Time	Time Card Time	Extra Time
	502	118	Lindgren	1737			9 00		1683	Anderson	1730			9 00	
1						44							44		
	613	1206	Johnson	2045			9 00		1510	Bergquist	1838			9 00	
2	316	537				46			1510				46		
	621	1152	Carlson	1935			9 16		1625	MacKenzie	2262			9 16	
3	206	354				37			1625				37		
	431	551													
	Bloom (545)	(815)	Wheeler	2411			2 30 ~~9 00~~	✓	1620	Swenson	2280			9 00	
4	1242	618		2003	✓	54	6 30	✓	1548				54		
	1227	828	Killgren	1703			9 00		1603	Norheim	1778			9 00	
10						59							59		
	1245	847	DeKolkKolk	2125			9 00		1599	Berg	1758			9 00	
11						58							58		
	529	835					3 06		1601					3 06	
	556	943	#4 Grand				3 47		✓					3 47	
	1206	316					3 10		1510					3 10	
	1152	206					2 14		1625					2 14	
	455	617	#27-Snell				1 22		✓					1 22	
	421	728					3 07		1537					3 07	
	435	554					1 19		1150					1 19	
	618	814					1 56		1229					1 56	
					107.57	6.46						107 57	6.46		

Portion of Daily Time Sheet for a Weekday of One Line in Minneapolis

The normal time for the weekday schedule is calculated in advance and sufficient duplicator copies are made to last for a payroll period. As the trip sheets come in, they are checked against this sheet and variations from the standard time card are noted. Also the car number used in each run is marked on this sheet. This system has saved half of the time clerks used previously and has been operating successfully for some time in Minneapolis and St. Paul.



FORM [illegible]

TWIN CITY LINES

FOR HALF MONTH ENDING ________ 192__

	OCCUPATION RATE	NAME	BADGE NO.	1	2	OVER TIME	PULL OUT AND PULL IN TIME		TOTAL TIME	RATE	AMOUNT	BONUS	TOTAL	DEDUCTIONS THRIFT FUND	EMP. LOANS	OTHER	BALANCE	TIME [illegible]	CHECK NO.	REMARKS
		OVERTIME									68									
1	A 55	F. GUST JOHNSON	59	601 601					12006		6605		6673	250	504		5919		696	
		OVERTIME		25							29									
2	A 55	GEO. E. GRUBER	63	925 925					13331		7343		7372	300			7072		697	
		OVERTIME									01									
3	B 55	HANS PEII	67	920 920					13805		7594		7595	300			7295		698	
		OVERTIME		25							23									
11	B 55	CHAS. O. DEMARAIS	91	925 925					13258		7313	200	7536	325			7211		706	
		TOTAL OVERTIME		145																
		TOTAL TIME		9806																
		PULL OUT AND PULL IN																		

Examined by

________ Foreman

Facsimile of One Sheet of the Minneapolis Trainmen's Payroll, on Which Are Transferred Daily the Actual Time Plus the Allowed Time that Each Trainman Worked the Day Before

Prior to the payroll period, the names and numbers of the trainmen operating this line are entered, as well as the time for each run and the total time of the run with the "time allowance" permitted. The total time allowed by the time card is included at the bottom.

When the trip sheets for a day come in, these are checked against this daily time sheet. If there are any changes the duplicated figure is crossed out and the new figure written above it. Usually there may be one or two changes on each time card. The difference in time is quickly calculated, subtracted or added to the total and the day's time for that line is completed.

The time for each man is then transferred to the semi-monthly payroll. The condensed facsimile of the form used is shown at the top of this page. The method of filling it in is obvious.

By the use of this method no timekeepers are needed at the station. The trip sheets are examined as they are turned in and then bundled up and sent to the auditor's office. Here they are checked against the standard time sheets. Necessary changes are re-entered on the payroll for the half month. Six girls in the auditor's office now do the work which previously required twelve clerks. Besides this, they have time to spare for other work. In fact, it is stated that five girls could do all of this work during eight hours a day. There are at present 2,200 trainmen, but the same force has done the work for 2,500 trainmen.

Some little difficulty is experienced when the lines are thrown off schedule, as, for instance, in case of a heavy snowstorm, but if every line were thrown completely off schedule due to some such cause, the situation for a day or two would be no worse to handle than the normal day on the old basis. Naturally these days of abnormal conditions are very infrequent.

Three different time cards are in effect on the system, weekday, Saturday and Sunday. Sheets similar to those represented are made up for each kind of time card.

Radio Stunt—A Valuable Advertiser

An UNUSUAL method of using the radio as a valuable advertising medium has been successfully developed by the Northern Texas Traction Company, Fort Worth, Tex. The first program was so refreshing in its novelty that it brought a total of 2,612 "fan letters," a record for station WBAP. The programs are broadcasted semi-monthly from station WBAP of the Fort Worth *Star-Telegram* and *Record-Telegram*.

This popular stunt consists of a round trip between Fort Worth and Dallas on the "Crimson Limited," the non-stop interurban train of the company. A specially constructed noise-making device reproduces all the sounds made by interurban trains in actual operation, such as the conductor's signal bell, warning gong, click of wheels and whistle. With this realistic obbligato the announcer describes the passengers, scenery and incidents of the road with so much enthusiasm that many of the listeners are reported to believe that the program is actually being broadcasted while the train is going over the line. New incidents of the trip are introduced from time to time to give variety to the program.

The advertising advantage of these programs is tremendous and varied. As far as the general public is concerned, the radio not only provides direct contact with the majority of potential patrons but it also offers an opportunity for follow-up advertising in connection with the mass of "bad mail" which is continually coming in. All of these communications are immediately answered by letter, over the signature of the passenger agent, containing a souvenir time-table.

With the radio activities of the company growing popular the company has recently erected its own studio. In addition to the trip on the "Crimson Limited," entertainment is furnished by three orchestras and various vocal artists, many of whom are recruited from the company's own ranks.

Berlin Carries Out Extensive Car Improvement Program

SECOND ARTICLE

Cardan Drive Being Used in Various Combinations and Is Considered Especially Desirable for Trains of Two Motor Cars—For Such Use Two Motors Only Are Required to Drive All the Axles of the Train—Cardan Drive Gearing Shows Practically No Wear After a Run of 58,000 Miles

By Wilhelm Pforr
General Manager Berlin Street Railway System, Inc.,
Berlin, Germany

This series of two articles is based upon an article by the author entitled "Die Entwicklung des Wagenparks der Berliner Strassenbahn," in the *Zeitschrift des Vereines deutscher Ingenieure* for Nov. 13, 1926, supplemented by other information just received by ELECTRIC RAILWAY JOURNAL from Mr. Pforr.

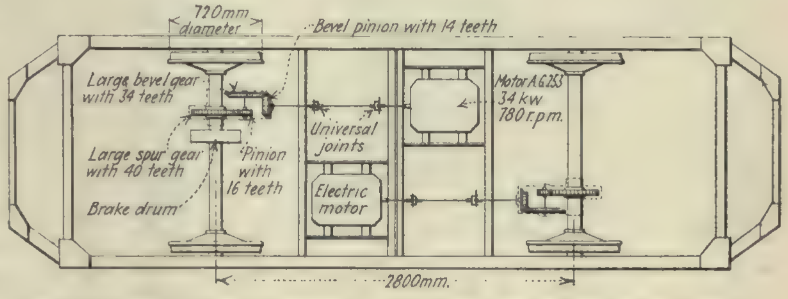

720mm diameter
Bevel pinion with 14 teeth
Large bevel gear with 34 teeth
Large spur gear with 40 teeth
Pinion with 16 teeth
Brake drum
Universal joints
Electric motor
Motor A.G.253 34 kw 780 r.p.m.
2800mm.

Fig. 15—Plan of Floor Framing of Car with Two Cardan-Drive Motors

DEVELOPMENT of car design in Berlin, Germany, up to the present time was discussed in the article published in this paper for Jan. 29, 1927. Some particulars were given of the experimental use of Cardan drive on several recent cars. The general principle of the application of this system of drive is shown in Fig. 15. This particular car has a weight empty of 12.15 metric tons (26,730 lb.) and a gear reduction of $\frac{34 \times 40}{14 \times 16} = 6.1$.

In some motor cars under construction, the installation of Cardan drive is being made with a single motor of double capacity instead of two motors of 35 kw. (47 hp.)* capacity. Such a motor will have two sets of gears as shown in Fig. 16. It will be noted that this is a modification of the former Cardan drive and that both axles are connected mechanically together by means of Cardan gearing. The motor is set midway between the two axles and has a capacity of 70 kw. (93 hp.) and a speed of 1,200 r.p.m. With this size of motor, as with the two motor equipment, it is possible for a motor car to haul two trailers.

Figs. 17 and 18 show the appearance of the Cardan gearing in our experimental car after running 54,000 km. (33,750 miles). As will be seen it shows practically no evidences of wear. Since these views were taken the car and gearing have completed 93,000 km. (58,000 miles) in operation, with no more appreciable wear on the gears than that shown in the illustrations. Moreover, the gearing is operating as noiselessly as at first. These results, as well as the high efficiency of the combination, are to be attributed largely to the method of drive employed. In addition, the Cardan drive possesses the following advantages over spur gearing:

ADDITIONAL ADVANTAGES OF CARDAN DRIVE

1. The operation of the gearing is accompanied by very little noise, partly because the operation is in an oil bath and also partly because the elimination of motor axle bearings makes possible permanent precision in the meshing of gears.

2. Wear on the faces of the teeth is very small.

3. Abandonment of the motor axle bearings does away with the necessity of their maintenance.

4. Addition of lubricant to the gear system is necessary only infrequently.

5. Owing to the complete spring support of the motors, the life of the roller bearings, including their housings, is greatly increased.

6. The removal of the motor from the axle greatly reduces the non-spring supported weight of the car.

7. Locating the motors with their armatures at right angles to the axle of the car makes it practicable to drive both car axles with one motor and obtain excellent braking and acceleration. As shown in Figs. 20 and 21, we have adopted this form of construction for our new trains with two motor cars, obtaining traction on all

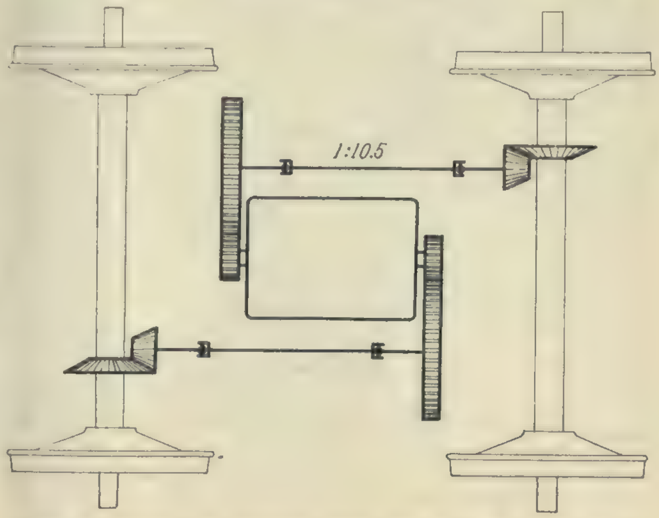


Fig. 16—Method of Driving Two-Axle Car with One Motor

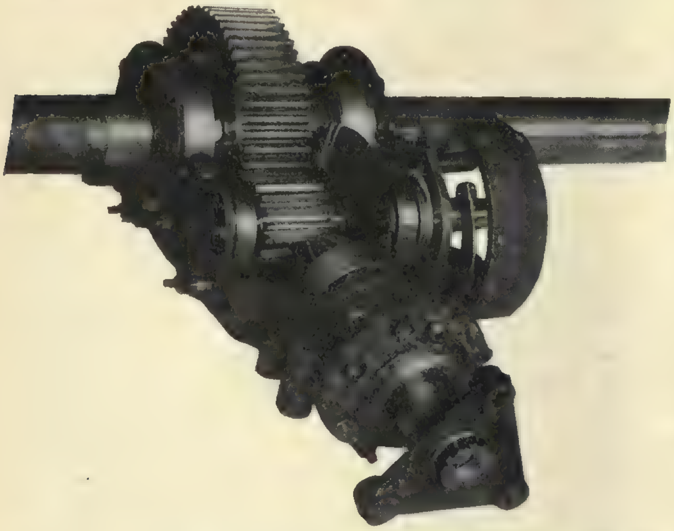


Fig. 17—Cardan-Drive Gearing with Cover Removed, of the type Shown in Fig. 15, Operated in Experimental Service. In This Case the Brake Drum Is on the Gear Shaft and Not on the Axle

eight wheels with but two motors. The result is we have a two-car train carrying 140 passengers and driven with but two motors, which possess good braking and acceleration. It is obvious that both first cost and maintenance cost of two motors is less than if four motors of the same total capacity were used. It appears to us that this arrangement might be of interest to American properties.

8. Suspension of the motors from the car body permits greater latitude in the height of the car floor, and step heights can be made less than with spur gearing.

9. The motor and gear drive can be constructed together as a unit.

10. It is possible to use higher speed motors than with spur gearing.

11. It is also possible to build motors with a greater armature length, as this length is not limited by the wheel gage, as with spur gearing.

12. The entrance of gear grease into the motors, which sometimes occurs, especially with motors of the ventilated type when spur gearing is used, is impossible.

APPLICATION TO TWO-CAR TRAINS

Use of motor cars along with trail cars presents some operating difficulties since considerable switching has to be done at the ends of lines unless there are loops. This indicates the desirability of making up each two-car unit not of a motor car and trail car, but of two motor cars and having in each motor car a motor of sufficient capacity to operate it independently. This for Berlin conditions was decided to mean a motor of 35 kw. (47 hp.) capacity and the system of drive shown in Fig. 19. As will be seen from the diagram and gear ratio, this meant a motor speed of about 800 r.p.m. with a single bevel gear drive for each axle. Instead of the bevel gear drive, a worm drive can be used, if desired, and it will have the advantage that it will permit a gear ratio of 1 to 9 and allow the use of a higher speed motor. One car with worm drive is being built for the Berlin Street Railway and will be put in operation within a short time. As to the results to be achieved it is impossible now to say.

Two coupled motor cars with the method of drive illustrated in Fig. 19 have been fitted up and are shown in elevation in Figs. 20 and 21. This method of drive has been applied to two cars exactly alike and designed always to be coupled together, and this articulated unit will shortly be put in service. Ten other cars of this kind are now under construction. They are of the center entrance type. The wheels are of 650 mm. (25½ in.) diameter and the wheelbase is 3.2 m. (10 ft. 6 in.). The body length outside of posts is 11 m. (36 ft. 1 in.) and the running gear is of the Peckham type with pendulum action so as to permit some axial displacement. Thereby the effect of blows to the car body due to bad track and at entrance to curves is reduced. At the same time the side thrust of the axle on the roller bearings is reduced, and this should have a material effect on their life.

The use of small diameter wheels and center entrance and the fact that the motors are attached to the body of the car allows the car floor to be about 130 mm. (5⅛ in.) lower than on the other recent type of cars of the company, as shown in Fig. 11 (see previous article). This facilitates the boarding and alighting of passengers. Moreover, since it is possible with the center entrance car to combine the space formerly taken by the two end platforms in one large center platform, it is practicable to install two separate doors of ample width to permit a passenger to enter and another to leave the car at the same time. A gain is also made of four seats, and passengers no longer interfere with the motorman in boarding or leaving as with end platforms. Lastly, the conductor has better control over entrances and exits than when one door is at one end of the car and one at the other.

DOUBLE-DECK CARS NOT DESIRABLE

In addition to these advantages of the center-entrance car, the two-car train has the further advantage that the cars do not have to be uncoupled at the ends of the line. All axles of the two-car train are driven, permitting rapid acceleration and better braking. There has been some agitation in the daily press that the Berlin Street Railway should put on double-deck cars to increase the seating capacity. Such a policy is not desirable, especially since Berlin has a number of points on its streets where there is little clearance under the

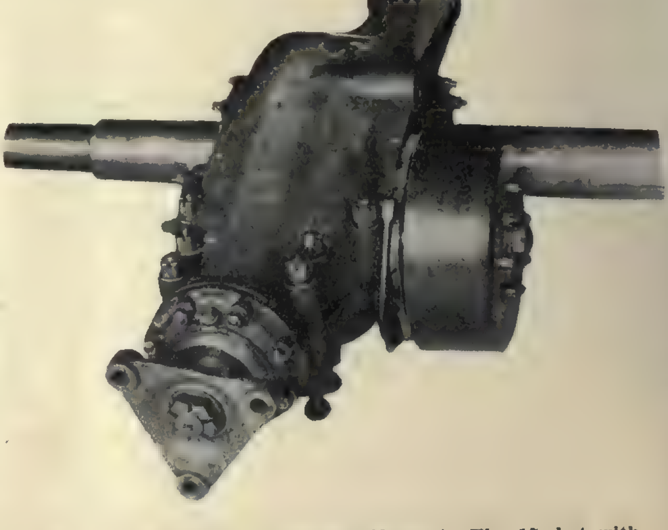


Fig. 18—Cardan-Drive Gearing Shown in Fig. 17, but with Cover in Place

Interesting Construction on Cleveland Car Station

Preparatory to Constructing a New Car Station on West 117th Street, It Was Necessary to Build Drainage Culvert—Method Used to Construct This Culvert Illustrated

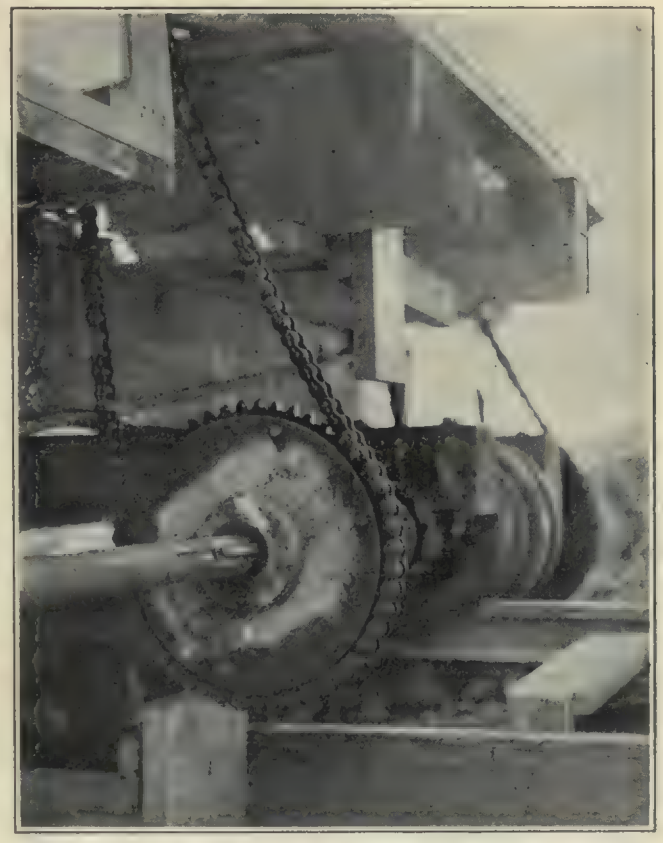
PROPERTY on which the new car station of the Cleveland Railway at West 117th Street and Linnet Avenue was to be built had a stream running through it in a deep ditch. This necessitated the construction of a culvert. Because of the broad curve of this open ditch and stream certain problems were presented that were solved by the use of a traveling bridge designed to carry batches of concrete from the mixer located at one end of the property abutting the street.

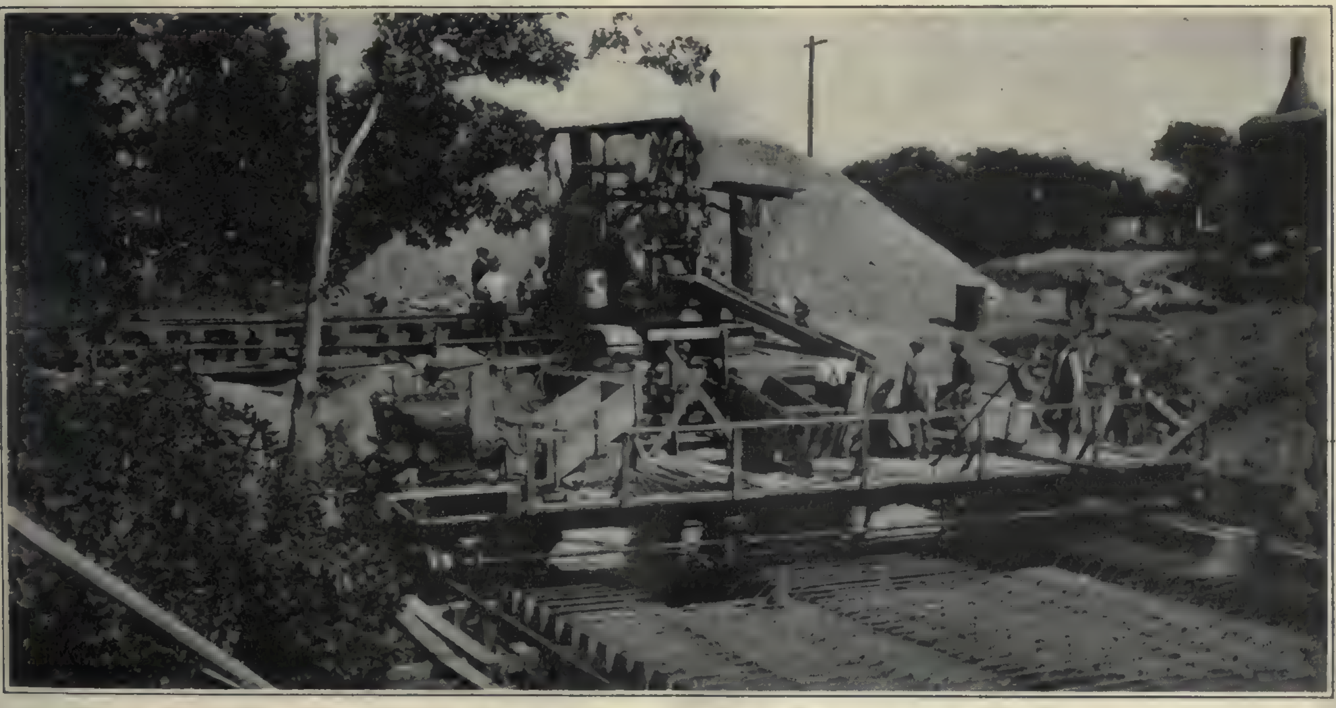
This bridge, shown in several of the views, has a span of 36 ft. from rail to rail on which it runs. For a short distance the 36-ft. gage track is tangent and then swings onto a long curve having an inside rail radius of 197.26 ft. and an outside rail radius of 233.07 ft. The problem was naturally to construct the bridge and track so that the bridge would swing around the curve, even though the outer wheel must travel a longer distance. This was accomplished by using a larger diameter wheel on the outer end of the bridge that came into play on an offset rail just at the point of tangency with the curve.

CURVE RAIL OFFSET TO ACCOMMODATE LARGE WHEEL

The wheels used on the tangent sections are of the same diameter on each end of the axles, namely, 12 in. The two larger wheels on the outer end of the bridge are of 14½ in. diameter and are mounted adjacent to the smaller ones. The size was calculated previously to give the proper swing to the outer end of the bridge when traveling around the curve. To accommodate the outer or larger wheel the rail on the curve is offset as shown in the views, leaving an overlap to provide easy rolling from one rail to the other.

A Ford automobile has been rigged up on one end of the bridge to furnish the propulsion power. Rear wheels have been removed and sprockets substituted that drive, by means of chains, both axles of the bridge.

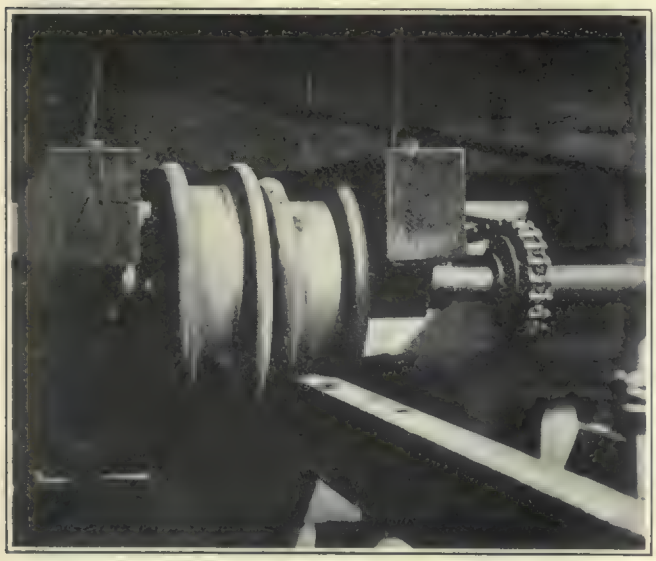

The Traveling Bridge Used on Cleveland Railway Culvert Construction Is Driven by a Ford Automobile with Sprockets Substituted for Wheels and Connected to the Two 36-Ft. Axles by Sprocket Chains, as Illustrated in This View


Mixing Plant at One End of the 400-Ft. Culvert Being Constructed Prior to the Erection of the New Car Station of Cleveland Railway on West 117th Street. A Ford-Driven 36-Ft. Bridge Carries the Mix and Other Materials to Any Point on the Job, Part of Which Extends Around a Curve

At the Point of Tangency on the 400-Ft. Runway Over the Culvert a Second Rail Is Used to Accommodate a Larger Wheel, Allowing Bridge to Swing Around Curve in Perfect Alignment

Some little difficulty was experienced at first in the relative forward and reverse speeds. The outbound speed with the load was rapid, but in the reverse direction it was too slow. To overcome this the sprockets were changed to give the same outbound speed as originally planned but with the engine in second speed. Since the reverse speed of a Ford drive has nearly the same speed as second, this difficulty was overcome and the operation of the bridge made practically the same in each direction.

Two culverts of reinforced concrete were built in this manner by the Bituminous Construction Company for the Cleveland Railway. Each is 10 ft. high by 12 ft. 6 in. wide. When complete the culverts will be covered over and the car station and tracks constructed on top of this structure.



The Tangent Running Wheels Are 12 In. Diameter. To the Left Is One of the 14½-In. Wheels that Engages a Rail in that Position, Allowing the 36-Ft. Bridge to Travel Around the Curve in Proper Alignment

Des Moines Pass Riders Increase

MORE than 10,000 Des Moines citizens are now users of the weekly pass recently started by the Des Moines City Railway, Des Moines, Iowa. The pass idea started with the Sunday pass for 25 cents, which materially increased riding on these otherwise light traffic days.

Some of the suggestions for pass use offered by the company are as follows:

Ride to lunch at home or favorite restaurant or club.

Go to lodge meeting, prayer meeting, entertainment at night.

Loan your pass to the wife, so that she can shop before dinner.

Loan your pass to one of the youngsters for the evening.

Ride as short a distance as you please, to escape rain or snow, or to let the car carry your parcels.

A message to the automobile user is contained in an estimate of operating costs totaling 9 cents a mile, made up of the following items:

	Cents
Cost of car	3.0
Repairs	0.5
Gasoline and oil	2.5
Tires	1.5
Storage, taxes, insurance	1.5
Total	9.0

You can ride in a closed car with driver on a weekly pass for 1 cent a mile. Think what you could buy with the difference!

Another stunt used to increase interest in pass usage is a lucky number contest, by which five lucky numbers are chosen each week, entitling the winners to a prize of a $1.25 pass plus a ticket to a local theater.

On Nov. 20, 1926, a new contest was announced and $25 was distributed to the seven best writers of letters on the use of the pass. The letters were judged by a committee of Des Moines business men and the prize winners were announced in a December issue of the company leaflet distributed on the cars.

Modern Equipment Described for Passengers

THE Pennsylvania Railroad is distributing a fourteen-page pamphlet in which modern cars and locomotives of the various types and classes now in use on the system are pictured and described. In addition to 30 pictures of the leading types of locomotives and cars now in service on the Pennsylvania, the pamphlet includes a short preface, seven pictures of cars and locomotives used in the early days of railroading in America, and eight views of the Altoona works, the principal shops of the Pennsylvania Railroad and the largest railroad shops in the world.

The illustrations of modern locomotives and cars include ten pictures of steam locomotives, four electric locomotives, electric passenger locomotive, electric switching locomotive, electric passenger and freight locomotive, electric passenger coach, gasoline-electric rail motor car, standard passenger coach, combination passenger and baggage car, dining car, mail car, combination baggage-mail car, baggage car, box car, automobile box car, refrigerator car, stock car, flat car, low-side gondola car, high-side gondola car and hopper car.

Each type of locomotive and car is accompanied by a brief description giving the salient facts in regard to weight, length, capacity and tractive power.

The Readers' Forum

Attractive Cars Increase Riding

CUMBERLAND COUNTY POWER & LIGHT COMPANY

PORTLAND, ME., Jan. 19, 1927.

To the Editor:

I am in hearty co-operation with the idea expressed in the article on attractive car appearance which appeared in the Jan. 15 issue of ELECTRIC RAILWAY JOURNAL. The best reason for the use of modern and well-maintained cars is to attract more passengers and give a lasting impression of comfort, regularity of service and safety. They will induce more people to use the cars regularly since people will ride in the conveyances that they find give them the most comfortable and dependable service.

The general appearance of rolling stock as viewed from the street is one of the best advertisements of the class of service given by a railway. Good maintenance is by far the cheapest. Special attention should be paid to cleanliness, heating, lighting, seats, ventilation, reduction of noise, proper destination signs and riding qualities of both cars and tracks.

Motormen and conductors should be well trained in salesmanship, neatness and high-operating ability so as to make the ride pleasant and safe. When this is done the number of riders will increase.

R. T. CHILES,
Master Mechanic.

Attractive Cars and Frequent Service Solved Fort Wayne Problem

INDIANA SERVICE CORPORATION

FORT WAYNE, IND., Jan. 26, 1927.

To the Editor:

Some years ago the Indiana Service Corporation began buying cars. As a result, all of the cars now in regular operation are of very short average age, the oldest dating from 1918. In the evening rush hour we use some trippers that go to the factories and pick up employees who are carried to the various lines without transfer. These cars date back to 1911, but they are the very oldest cars we own. However, the 1911 cars are only used for one trip in the evening rush and all other cars are 1918 or more recent still.

At the time the first modern cars were bought, that is to say about 1918, this company went into the proposition of using a distinctive color. Fort Wayne has narrow streets and some of them have heavy traffic for a city of this size. It was thought necessary to have a very bright, attractive color for the cars because of the street congestion and also because of the fact that such a bright color acts as a good sales argument in advising the public that a car is approaching. The color selected was a bright lemon yellow. It has been adhered to ever since. The results obtained with this color were all that could have been desired. The cars are very easily picked out from other traffic on the street.

We attempt to keep them well painted and well cleaned, because our street cars are our show window and we want them kept in the most attractive form possible.

We operate a large number of car-miles because we believe that frequency of service is a very important factor with the public. All cars in Fort Wayne are one-man operated. The public apparently is pleased with the service, and while we do receive complaints occasionally, these are decidedly infrequent.

Of course, in connection with the cars, we have also put forth every effort to keep the track in good condition, because a good car operating over a rough track will not give a smooth ride and the public insists on having the smoothest ride possible.

HENRY BUCHER,
Manager Railway Department.

Safe, Clean and Comfortable Cars a First Need

SHREVEPORT RAILWAYS

SHREVEPORT, LA., Jan. 25, 1927.

To the Editor:

The providing of greater comfort, safety and convenience for the traveling public is indeed an important subject and requires constant thought and study. The first duty of a street car company is to provide cars that are sound, safe, clean and as comfortable as possible. The service must be frequent and dependable. The speed should be as fast as safety will permit. The employees on cars must be courteous and obliging to the traveling public at all times. After these things we begin to think of the refinements that will attract new business, and we should go as far in that direction as the earnings will permit.

When purchasing new cars, we have tried to get the latest features in design, that will increase the safety and riding qualities. To improve the lighting, we replaced the green ceiling with white, and replaced the cluster lights in the center of the ceiling by distributing the lamps on each side. These changes have brought out very complimentary remarks from the patrons of our line.

We replaced the monitor roofs with arch roofs. This also improved the appearance and made the car lighter. To improve the riding qualities, we are revamping all of the older type trucks with the latest Brill system of spring suspension and brakes.

To eliminate noise we are replacing the split spur gears with solid helical gears and pinions. We have adhered to the Pullman green color for the outside of our cars. This we find durable and in harmony with the buildings and surroundings along our tracks. Our sash, doors and inside trim are of cherry.

We have not departed from the use of slat seats, about which we have never had any complaints from our patrons. For short rides we do not believe seat upholstering is justified, under the low rate of fare fixed by the government authorities. We have never had any complaint about the riding qualities of our double-truck cars, but the single-truck cars are not satisfactory except on very smooth tracks. We have determined never to buy or build any more single-truck cars, because it is almost impossible to keep the track smooth enough for these cars to give satisfactory riding.

H. B. HEARN,
President.

Maintenance Notes

Southern Properties' Pull-In Record

FIGURES for the year 1926 compiled by the Electric Railway Association of Equipment Men, Southern Properties, show an average of 17,200 car-miles per pull-in chargeable to equipment. The average for thirteen companies during the past year is slightly under that for twelve companies in 1925, when the average was 17,350 car-miles per chargeable pull-in. The combined total for all companies in the association last year was 4,817 chargeable pull-ins, of which 4,320 were reported by the twelve railways which reported 4,655. Total pull-ins chargeable to equipment and otherwise numbered 7,222 in 1926, of which 6,665 were on properties reporting 6,832 the preceding year.

New Orleans, Nashville and Knoxville stood first, second and third in the mileage per chargeable pull-in last year as they did before.

Comparative Statement of Car Pull-Ins for Year 1926, Southern Properties

Not Chargeable to Carhouse

	New Orleans	Nashville	Knoxville	Atlanta	Little Rock	Birmingham	Texas Electric (Dallas)	Memphis	Mobile	Dallas	Covington, Ky.	Montgomery	Chattanooga
Armatures	13	11	8	64	8	171	51	81	18	147	43	54	87
Armature bands	....	....	....	1	3	24	....	9	5	10	....	2	72
Armature shafts	....	....	....	4	....	19	4	9	....	4	....	....	1
Armature bearings hot	....	10	....	3	....	18	11	20	5	14	5	3	15
Axle bearings hot	....	....	1	....	....	....	5	8	....	1	....	8	1
Commutator	....	....	....	....	....	14	17	13	1	6	3	7	17
Brush yoke	....	2	....	1	....	....	1	3	2	8	....	4	....
Brushes and holders	1	....	....	25	3	23	11	41	5	32	24	27	31
Fields	6	13	2	23	9	127	10	27	12	65	12	76	28
Field jumpers	....	2	....	13	7	8	2	3	4	47	....	7	17
Motor leads	1	4	....	10	7	16	18	15	8	35	17	44	25
Gears and pinions	1	....	....	8	....	7	6	1	....	9	....	4	11
Gear cases	....	....	1	2	....	4	....	....	2	5	3	4	5
Other motor trouble	....	....	....	....	....	2	1	12	4	29	....	20	2
Trolleys	....	1	4	6	2	2	14	4	1	1	6	2	16
Circuit breakers	1	....	3	6	1	2	1	1	....	22	4	2	9
Line breakers	3	....	6	9	6	1	14	29	2	6	....	....	14
Main fuse	....	....	....	....	....	....	....	3	....	....	....	....	....
Controller	3	2	12	21	10	9	22	37	7	16	20	40	41
Cables	5	....	3	16	6	12	22	16	2	17	6	22	20
Rheostats	1	....	4	8	2	12	7	12	3	8	6	10	5
Air brakes	2	2	4	26	17	17	38	14	20	76	2	12	115
Safety car equipment	....	....	....	14	12	....	6	29	7	....	....	28	....
Door engines	....	....	....	....	....	1	....	1	....	6	....	....	....
Whistles	....	....	....	....	....	....	....	....	....	....	....	....	....
Frozen air	....	....	....	....	....	....	....	12	....	....	....	....	....
Other air troubles	....	....	3	....	....	1	2	8	1	76	....	5	....
Lights	1	....	....	2	2	5	1	2	2	3	5	....	4
Headlights	....	....	....	1	2	3	3	11	1	5	....	32	5
Signal lights	....	....	....	....	....	....	....	....	....	....	....	....	....
Door switch	....	....	....	1	....	....	....	....	....	2	....	....	....
Heaters	....	....	....	2	....	....	9	1	....	2	11	....	2
Electric bells	....	....	....	2	1	4	1	1	8	16	2	4	2
Lightning	....	....	2	....	....	7	15	22	....	....	....	7	6
Car charged	....	....	....	2	....	....	....	....	2	2	....	....	....
Axles	7	....	5	4	2	4	2	7	....	8	....	2	1
Wheels	1	....	1	5	....	19	2	3	....	2	....	7	10
Journals and boxes	....	....	....	1	....	10	1	2	1	....	....	....	7
Hot journals	....	....	....	6	2	14	4	1	....	7	6	1	12
Hand brakes	....	....	....	....	2	1	....	....	2	....	39	14	3
Slack adjusters	....	....	....	....	....	....	....	....	1	3	....	....	....
Brake rigging	8	....	7	27	6	32	10	33	12	73	....	13	113
Other truck troubles	....	....	....	....	1	23	10	3	3	28	7	2	5
Doors and riggings	....	....	....	1	1	8	1	11	5	17	....	10	51
Door treadles	....	....	....	....	....	1	....	6	....	9	....	....	2
Windows	....	....	....	....	2	1	1	....	....	1	....	1	7
Seats	....	....	....	....	....	....	....	7	3	2	....	2	3
Steps	....	....	....	....	....	1	1	2	1	4	....	3	1
Registers	....	....	....	1	....	....	....	2	3	....	....	5	1
Signs	....	....	....	....	....	....	....	....	....	....	....	....	1
Gongs	....	....	....	1	6	1	6	7	2	3	3	5	9
Sand rigging	....	....	....	3	....	....	....	1	....	....	3	3	7
Fenders	....	....	1	....	....	1	....	1	....	1	5	....	23
Draw bars	....	....	....	....	....	5	....	....	....	....	....	....	....
Snow scrapers	....	....	....	....	....	....	....	....	....	....	....	....	....
Other body troubles	2	....	....	1	....	14	2	7	2	7	3	5	11
Unclassified	....	....	1	....	4	2	11	20	4	41	7	....	52
Total chargeable to equip.	56	47	68	320	124	646	343	558	161	876	242	497	870
Total car-miles	14,620,719	5,580,039	3,615,130	13,228,990	2,900,266	11,324,827	5,426,129	8,000,309	2,097,729	9,124,008	4,043,083	1,596,064	1,392,832
Average pull-ins per day	.15	.13	.19	.88	.34	1.77	.93	1.53	.43	2.40	.66	1.36	2.38
Average miles per pull-in	261,084	118,724	54,866	41,340	23,389	17,531	15,829	14,337	13,029	10,416	16,707	3,211	1,501

Chargeable to Carhouse

	New Orleans	Nashville	Knoxville	Atlanta	Little Rock	Birmingham	Texas Electric (Dallas)	Memphis	Mobile	Dallas	Covington, Ky.	Montgomery	Chattanooga
Accidents	86	39	28	163	56	136	26	204	59	195	93	32	219
Split switches	....	19	6	8	1	8	3	4	1	3	....	....	....
Derailments	2	4	7	3	....	8	9	....	4	13	6	4	7
Doors and steps	1	....	....	3	....	5	13	....	3	....	8	6	....
Broken glass	....	13	....	2	1	3	18	11	12	68	67	7	11
Trouble reported, none found	....	....	1	9	1	4	4	26	2	58	17	10	139
Unclassified	....	2	3	1	....	1	38	6	1	99	278	1	....
Total not chargeable to equip.	89	77	45	189	59	165	107	251	82	436	469	60	376
Average pull-ins per day	.24	.21	.12	.52	.16	.45	.29	.69	.22	1.19	1.28	.16	1.03
Average miles per pull-in	164,277	72,468	31,670	69,995	49,159	68,635	50,712	31,874	25,582	20,927	8,621	26,601	3,704
Total pull-ins	145	124	113	509	183	811	450	809	243	1,312	711	557	1,246
Total average pull-ins per day	.40	.34	.31	1.39	.59	2.22	1.23	2.22	.66	3.59	1.94	1.52	3.41
Total average miles per pull-in	100,833	45,000	32,524	25,991	15,848	13,964	12,058	9,889	8,633	5,954	5,686	2,865	1,118

"Nix on the nicks," while winding armatures,
Will minimize your broken lead failures.

Atlanta moved up from fifth place to fourth, and Little Rock from ninth to fifth. In all, eight railways made a better showing in 1926 than in 1925, while four reported smaller mileage per pull-in.

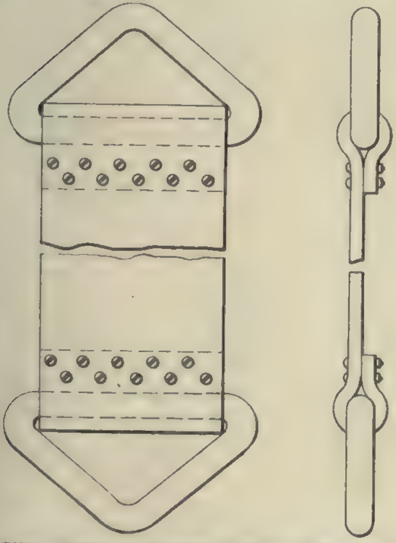
An accompanying table shows the number of pull-ins for each company listed under 64 classifications.

The principal classes of defects which have caused most detentions are: Armatures, fields, brushes and holders, controllers, air brakes, and brake rigging. This table also serves to give a very definite idea as to the classification of defects that is used.

Sling for Lifting and Carrying Armatures

LIFTING or carrying armatures by means of hooks, chain or rope slings offers the danger of mechanical injury at the bearing fit, and bells, commutator or end connections. To eliminate this possibility entirely a flat sling has proved satisfactory in the Interborough Rapid Transit Company shops in New York.

This sling is made of five-ply Balata belting 12 in. wide and on each end is installed a closed lifting triangle made of ⅞-in. round iron. The belting is lapped over one side of each triangle and made secure by numerous ¼-in. stove bolts. In lifting an armature the sling is placed around the core at the center of gravity and both triangles hooked on the lifting device.



Sling Made of Balata Belting Prevents Armature Injuries During Shop Handling

New Style Tail Light Bracket with Spring Bolt Holds the Light in Position Securely

Spring Plunger Locks Tail Light in Place

ON CARS equipped with trolley catchers trouble was experienced by the Grand Rapids Railway, Grand Rapids, Mich., from the trolley rope catching underneath the tail light and lifting it out of its socket. Also, jars at crossovers frequently caused tail lights to become detached from the supporting brackets. In order to overcome this difficulty the bracket was fitted with a spring plunger. To install a tail light the plunger is pulled out against the tension of the spring. With the tail light installed in its bracket the plunger, when released, hooks over the bar of the tail light arm and so holds it down firmly. This has effectively overcome the difficulty. Accompanying illustrations show the method by which tail lights are now installed and are held in position by the plunger and also a tail light with the trolley rope caught underneath in a position to lift it out of the socket.

The Catching of a Trolley Rope Underneath a Tail Light Frequently Pulls the Tail Light out of Its Socket

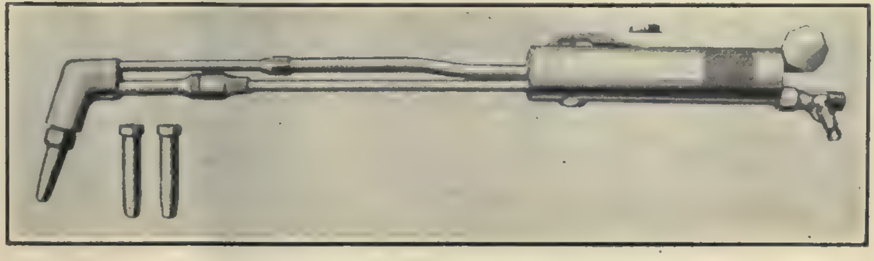
New Equipment Available

Torch Uses Oxy-Illuminating Gas

CUTTING of heavy plates, risers, gates, billets, etc., using either city gas, natural gas or by-product (coke oven) gas has been made possible by the development of a new oxy-illuminating gas cutting torch, manufactured by the Alexander Milburn Company, Baltimore, Md.

An interesting achievement of this type LPG torch is that it can be used with by-product (coke oven) gas. It is not necessary to have this gas scrubbed; it can be used just as it comes from the coke ovens. A recent test with this particular by-product gas with a low B.t.u. content showed a speed averaging 1 ft. per minute on 3-in. plate using 40 lb. oxygen pressure with the gas at ordinary line pressure without being boosted.

The cuts showed a sharp, clean edge, devoid of slag on the under-

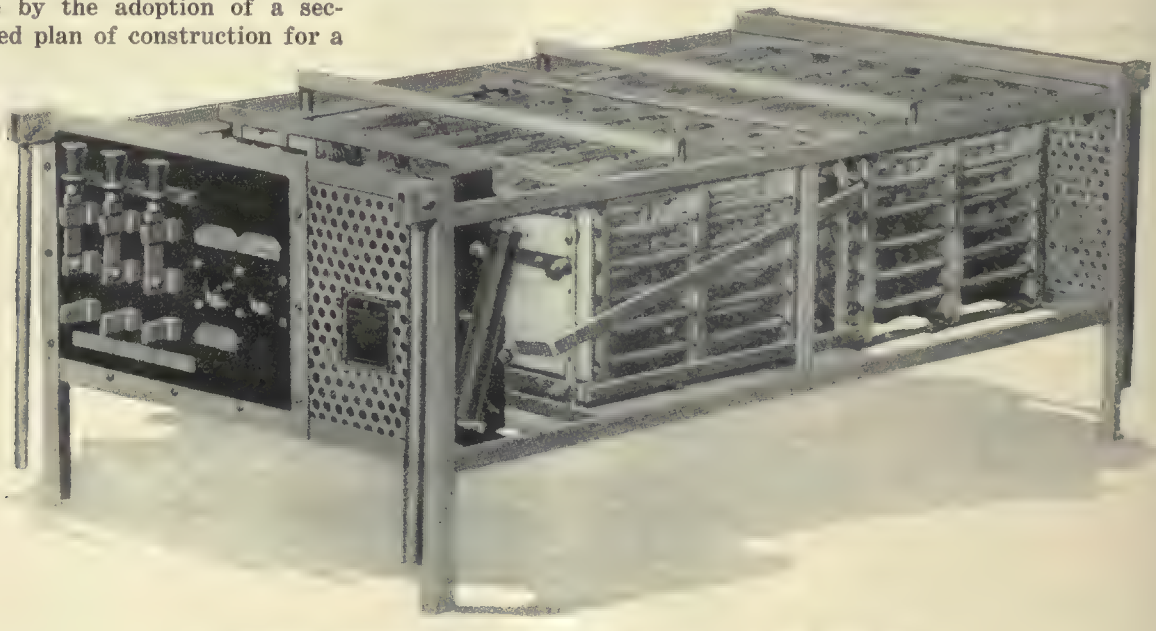


Cutting Torch for Use with Illuminating Gas and Oxygen side, a narrow kerf and very smooth surfaces. A very important feature is the absence of case-hardening of the surfaces, which makes for easier machining. The torch is made of bronze forgings and special seamless tubing, constructed to withstand constant and severe service. It is evenly balanced and ruggedly built. The high pressure cutting oxygen is controlled by a thumb valve.

The torch is supplied with a range of tips to accommodate all thicknesses of metal. The tips are made of solid copper, designed rapidly to preheat the gases, giving better penetration and quicker cutting.

Welder Built on a Unit Basis

NECESSITY for having all the elements of a welder in one block has been eliminated and a reduction in voltage stress on insulators and resistance wires has been made possible by the adoption of a sectionalized plan of construction for a new type portable resistance welder put on the market by the Ohio Brass Company, Mansfield, Ohio. Insulators used for supporting the resistance coils are made of an especially developed heat-resisting porcelain. Absence of holes or sharp corners on these insulators prevents excessive breakage under rapid changes in temperature. The surfaces which support the resistance coils are convex in shape to provide a point contact between coils and porcelain.



Portable Resistance Type Arc Welder Built on a Sectionalized Plan

Pressed steel upright supporting frames hold the insulators and resistance coils securely in position and at the same time provide clearance for the resistance wires. When assembled the insulators are interlocked. Retaining lugs on the frame are so spaced that should any of the insulators become cracked or broken as the result of unusual handling they will remain in position and the resistance coils cannot short or ground.

Each individual resistance element unit is a rigid and sturdy steel frame structure. Its design provides maximum protection both to the insulators and resistance coils and affords rapid heat dissipation. The spirally wound resistance wire is of a super-nickel-chromium resistance alloy made for continuous duty at temperatures approximately 50 per cent higher than those generally obtained in actual service. The wire resists oxidation and is non-corrosive. Undue stretching or sagging of the resistance coils is prevented by the close spacing used between the supports.

The main frame is a one-piece unit made of 1-in. x 1-in. angle steel braced rigidly and arc welded. The cover is made of hot-dipped rust-treated galvanized iron perforated to give rapid heat dissipation. The complete unit is light and is easily carried by two men. It is equipped with handles which drop down out of the way when the machine is in operation. The legs of the welder are drilled and tapped for attaching clamping studs, axles and wheels, which are furnished on special order.

The fourteen individual resistance units are arranged in two element blocks of seven units each instead of in one complete element block. The element blocks are insulated from each other and from the main frame by mica tubes and washers. Voltage stress on any one resistance unit is thus reduced and possible short circuit is minimized. Any one of the individual resistance units in either block may be removed for inspection without disturbing the other units.

A heavy-duty shunt-type contactor provided with a magnetic blowout is connected in series with the welding circuit. It completes or breaks the circuit as the electrode touches or is withdrawn from the work. Control of the machine is provided by a push button on the electrode cable adjacent to the electrode holder. This gives complete voltage protection to the operator when changing electrodes by enabling him to control the welding circuit at a remote point instead of at the machine.

The welder operates on any voltage from 400 to 600 in current ranges of from 30 to 210 amp. The current is regulated in steps of 20 to 30 amp., depending on the line voltage, by three single-pole, double-throw switches. These permit the operator to adjust the current to the requirements of the work. The welder operates on 400 to 500 volts when the switches are in the lower position and on 500 to 600 volts when the switches are in the upper position. Marker plates opposite the switch controls indicate the position of knife switches for a given voltage. Current ratings of individual switches are shown by marker plates located above and below the switch contacts.

Association News & Discussions

Active Interest Shown at Southern Equipment Meeting

Annual Pull-In and Maintenance Cost Reports of Member Companies for the Year 1926 Show Improvement Over 1925—Major Part of Meeting Devoted to Discussion of Maintenance Practices

RAPID-FIRE questioning of the author of each paper by other members brought out constructive information at the Memphis meeting of the Electric Railway Association of Equipment Men, Southern Properties, held Jan. 26 to 28. A preliminary report of the meeting was published in this paper last week. Letters were read from W. H. Sawyer, president American Electric Railway Association, and J. W. Welsh, executive secretary, expressing regret at their inability to attend.

E. W. Ford, vice-president Memphis Street Railway, addressed the convention and complimented the association for its progress and the valuable contributions made to the industry since it was organized.

In his opening address A. D. McWhorter, general superintendent Memphis Street Railway, president of the association, said that the Southern properties continued to show lower and more uniform maintenance costs than in the past. These compare favorably with maintenance costs in other sections of the country. Good public relations are obtainable only through good service and good service is dependent on properly maintained, clean, well-painted and attractive cars. He called attention to the progress made by the industry in establishing bus service and extending one-man operation. Electric railways are rendering a most important service to the public at less cost than any other industry in the country. "We have made progress," he said, "but we must stay one jump ahead of the game or we are falling short in our duty to ourselves, our communities, and our companies."

C. J. Axtell, special railway engineer General Electric Company, read a paper on "Car Equipment Apparatus." He spoke in detail about the changes which had been made in the manufacture of standard apparatus in order to minimize failures, facilitate inspection and decrease maintenance costs, and pointed out that manufacturers found it necessary to design equipment to suit the new and varied designs of light safety cars that are in operation today. An abstract of this paper appears elsewhere.

Following a lively discussion of Mr. Axtell's paper, R. S. Frehse, National Pneumatic Company, explained in a clear and concise manner how a circulating load is handled by means of a treadle-operated door. His paper is published in abstract elsewhere in this issue. T. R. Bristol, assistant superintendent of equipment Georgia Railway & Power Company, told of experience with 40 pneumatic treadle door equipments and 60 electro-pneumatic treadle door equipments. This paper explained in detail the troubles which had been experienced and how they were corrected.

E. L. Ray, employment agent Memphis Street Railway, presented a paper on the methods employed by his company in developing operators for the one-man cars. Requiring the motormen and the conductors to exchange positions for a few days under the guidance of an instructor soon provides skillful operators.

"Essential Features of Modern Cars" was the subject of a paper read by E. A. Palmer, special railway engineer Westinghouse Electric & Manufacturing Company. This paper will appear in abstract in a further issue of the JOURNAL.

In a paper on "Department Co-operation" J. L. Brown, master mechanic Dallas Railway & Terminal Company, emphasized that without full co-operation of all departments maintenance costs cannot be kept at a minimum.

MAINTENANCE DATA PRESENTED

On the second day the program started with a paper by J. H. Squires, machine shop foreman Georgia Railway & Power Company, on "Shop Practices on Wheels and Axles." This aroused unusual interest and created considerable discussion concerning methods of machining and assembling wheels and axles. A. J. Naquin, engineer rolling stock and shops New Orleans Public Service, Inc., read a paper on "Advantages of Overhauling Equipment on a 40,000-Mile Basis." Abstracts of these papers are given on another page.

AVERAGE MILES PER PULL-IN FOR THE YEAR 1926, SOUTHERN PROPERTIES

	Total	Chargeable to Equipment
New Orleans	100,833	261,084
Nashville	45,000	118,724
Knoxville	32,524	54,046
Atlanta	25,991	41,340
Little Rock	15,848	23,389
Birmingham	13,964	17,531
Texas Electric	12,058	15,829
Memphis	9,889	14,337
Mobile	8,633	13,029
Dallas	6,954	10,416
Covington	5,686	16,707
Montgomery	2,865	3,211
Chattanooga	1,920	2,750

COMPARATIVE MAINTENANCE COST OF EQUIPMENT PER 1,000 CAR-MILES FOR YEAR 1925, AND FIRST ELEVEN MONTHS OF 1926

	1925	1926
Memphis	$17.94	$16.16
Little Rock	18.90	16.32
Covington	19.32	18.75
Atlanta	21.54	20.24
New Orleans	19.78	20.37
Knoxville	22.28	20.56
Texas Electric	23.41	20.86
Mobile	27.80	24.80
Birmingham	25.42	25.25
Dallas	31.43	29.74
Chattanooga	30.37	33.08

C. B. Tutwiler, general foreman Memphis Street Railway, spoke on "Car Cleaning." He told how the cars are washed outside every three days with a Holcomb 4-in. bristle brush and clear water. At the same time the windows are cleaned inside and the dust removed from the lamps and interior woodwork with a soft cloth. After each car has finished its daily run, the interior is disinfected and the floor swept. Accumulation of dust is removed from the seats by means of a feather duster.

A. Taurman, superintendent of equipment, way and structures Birmingham Electric Company, Birmingham, Ala., spoke on "Good Housekeeping." He stated that with the shops and carhouses properly cleaned and maintained it is much easier to require better work from the men and to furnish the public with clean and serviceable cars.

The afternoon session was devoted to discussion of 36 questions prepared by member companies pertaining to equipment maintenance. Charts were distributed at the meeting showing the average miles per pull-in and maintenance cost per 1,000 car-miles for the

COMING MEETINGS
OF
Electric Railway and Allied Associations

***Feb. 7-10*—American Institute of Electrical Engineers, annual convention, Engineering Societies Building, New York City.**

***Feb. 18-19*—Kentucky Association of Public Utilities, annual convention, Brown Hotel, Louisville, Ky.**

***March 4*—American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p.m.**

***April 26-29*—Southwestern Public Service Association, convention, New Orleans, La.**

***Oct. 3-7*—American Electric Railway Association, annual convention, Public Auditorium, Cleveland, Ohio.**

year of 1926. These figures are given in accompanying tables. In the evening the delegates attended a banquet in the Louis XVI dining room of the Peabody Hotel.

The report of the nominating committee, election of officers, appointment of committees, and an inspection of the Memphis Street Railway and Memphis Power & Light Company's properties occupied the morning of Jan. 28.

New officers of the association elected for 1927 are as follows:

President, W. H. McAloney, superintendent of equipment Georgia Railway & Power Company, Atlanta, Ga.

Vice-president, R. M. O'Brien, superintendent of equipment New Orleans Public Service, Inc.. New Orleans, La.

Secretary, A. Taurman, superintendent of equipment way and structures Birmingham Electric Company, Birmingham, Ala.

It was decided to hold the twelfth semi-annual meeting of the association in Atlanta, July 27-29.

Improvements Made in Car Equipment Apparatus*

By C. J. Axtell

Special Railway Engineer
General Electric Company

CAR equipment apparatus is a comprehensive subject, and the most interesting phase is that dealing with recent improvements. Changes made in the K-35 controller are typical of the improvements in other controllers of this class. The back casting has been changed to include a vertical trough up the back on each side to provide sufficient room to install the largest size of motor cables. This shortens the time necessary to change a controller. The cable terminals are a flat flag type in which the cables are permanently soldered, and fastened to the finger bases by a cap screw.

Contacts of the cutout switch have been reinforced by heavy flat springs, increasing the capacity of the switch and eliminating troubles due to poor contact and overheated switches. Where the insulated hexagonal shaft is used, the insulation is molded on. It is now molded in hexagonal tubes which accurately fit the standard shaft and can be easily renewed, by dismounting the cylinder castings and replacing the damaged insulation with a new piece. Reverse fingers, having a flat phosphor bronze spring and a heavy copper contact tip, insure decreased burning at the segments.

All modern K controllers with individual finger blowouts are now provided with arc suppressor plates inserted in the arc chute between the deflectors. This plate consists of a specially molded part of arc resisting compound which partially closes up the arcing space and directs the arc through two narrow slots. The older lock type burning tips are replaced with a lap type or one in which the segment screw passes through a hole in both the segment and the burning tip so that it cannot loosen up and drop off the segment as might be possible with the old style.

Cap plates are now made with provision for mounting the LB control device without any machining operations. K-35 controllers furnished with cast aluminum alloy back and cap plates reduce the weight of the controller 19 per cent.

A new type of line breaker known as the DB-986 and DB-987, consisting of a very efficient arc rupturing contactor, magnetically operated and an overload relay inclosed in a box for under car mounting has been developed. This operates to break the motor circuit when normally turning off the controller as well as rupturing overloads and short circuits.

Among the recent improvements is the arrangement for removing the complete arc chute without the use of tools, simply by raising it up to unhook the top and withdrawing the chute, when the entire mechanism and the contact tips are exposed for inspection. The overload relay also has the novel feature of not only opening up the control circuit of the contactor, but also of mechanically opening the contact tips.

The early use of the line breaker provided for the breaking of the arc when the controller was turned to the off position. The ratchet switch improved this operation by requiring that the controller be turned backward but one step in order to open the line breaker. However, to improve further this operation the line breaker control device was developed. It is mounted on top of the cap plate. This permits the addition of this handle to any of the recently manufactured controllers, without the necessity of taking out the cylinder, changing the bearings or mounting any apparatus on the shaft. This breaker has the great advantage of opening up the control circuit of the line breaker on a slight backward movement of the controller handle and before the main cylinder has started to turn off.

With the advent of the new lightweight car, a new controller was needed which controller should be small, light weight and low in height. The K-75 controller was designed to fulfil this need. It has a capacity for operating four 50-hp., 600-volt motors. The contact tip is renewable by removing one cap screw. The arc chute is hinged to swing to the right instead of to the left, thus exposing for inspection all the fingers, blow-out coils and main cable connections when the arc chute is opened. Resistors used are in four sections, assembled in one group instead of with two groups as with the K-35 controller. The controller has five points in series and three points in parallel. A single motor cutout switch provides for cutting out two of the motors and permits operating the remaining pair in series-parallel relation instead of in series only.

For some classes of service a remote control is desirable. For this purpose a new type of magnetically operated control, known as the "Light Weight type M" has been produced. It is intended principally for the city or light interurban service as it has a capacity for four 60-hp., 600-volt motors. The motor controller, which handles all of the main motor connections except the reversing of the motor fields, consists of a contactor box with eight contactors, one of which functions as a line breaker.

A split cover on this box when removed permits the controller inspector to have ready access to all contacts, main terminals and control connections. The reverser has a cylinder similar to a standard K controller. This control has a hand acceleration, viz., it is governed by the movement of the master controller, for its five steps series and four steps parallel. But nine train wires are required for operation. Due to the modern designs incorporated the control current has been reduced to less than one ampere.

The US-20-A trolley base, like its predecessor the US-13, has four tension springs adjusted by a single screw and provides for fastening the pole by means of a clamp held by two bolts. The bottom of the base is flat, eliminating the necessity of recessing any projection in the wood platform. Instead of a series of long small rollers, this base has two sets of short tapered rollers, set in accurately machined raceways which are provided with very liberal grease reservoirs. Two pipe plugs afford easy means of filling oil to taper roller bearings and to pole socket axle pin reservoirs. A trigger lock can be actuated to secure the trolley poles socket in a lowered position for changing poles.

Stepping on It*

By Ray S. Frehse

Sales Engineer National Pneumatic Company

UNQUESTIONABLY the electric railways are "stepping on it." They are traveling at accelerated speed along lines of modern progress. In fact, within the last few years they have done more to attract car riders and provide an improved service than during any other time in railway history. The trend is as apparent in the South as in any other section of the country. It is a trend which clearly points toward the use of modern cars. By modern cars, I do not merely mean new cars. New cars are not necessarily modern.

The modern car is the car equipped with every essential and modern device for increasing safety, speed and comfort. It is the car constructed with luxurious seats and finely finished interiors. It is equipped with motors which assure fast acceleration and high running speeds. It is provided with modern air brakes, assuring quick stops and the safety of the riding public.

It must also be a car equipped with the most modern loading and unloading apparatus. If safety, speed and comfort are established as essential, there is surely no consideration more important than the problem of passenger interchange. If this problem is overlooked—if proper door and step control equipment is not provided—all other advantages of modern equipment may be easily offset.

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*Abstract of a paper presented at a meeting of the Electric Railway Association of Equipment Men, Southern Properties, held at Memphis, Tenn., Jan. 26-28.

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No matter how quickly a car accelerates or decelerates, no matter at what rate of speed it travels between stops, the gain in schedule speed is largely wiped out if excessive standing time is required to load or unload passengers at every stop.

Since the first inclosure of car platforms, there has been a decrease of 8.7 per cent in boarding and alighting accidents. This is based on the reports of 175 operating companies.

The eyes of the industry today are turned toward the operation of one-man cars. The automatic treadle door is an exit door operated by a pneumatic engine and controlled by a treadle plate set flush with the car platform. This system of controlling exit doors—by permitting passengers themselves to step on a treadle plate—has proved a boon to one-man operation. It has solved the loading and unloading difficulties encountered in the original type of one-man car.

While the first small type of one-man car made a decided cut in operating expense, it somewhat slowed up scheduled speeds due to the small door at the front of the car through which boarding and alighting passengers must pass. This caused considerable congestion at the door as well as unnecessary friction in the aisle and on the street. With such an arrangement, moreover, it was impossible to operate one-man cars in the cities below the Mason-Dixon line where a special law calls for separate exits for white and colored people. To eliminate this unsatisfactory condition a few properties provided two doors at the front of the car—one for an entrance and the other for an exit. While this helped to relieve the congestion of boarding and alighting passengers passing through one door, it did not eliminate the aisle friction nor keep the short-haul rider from standing near the front door, causing an unevenly distributed load.

The next step, however, was one in the right direction. It started the circulating load method of operation in one-man service. One or two properties installed at the rear of their one-man cars, a pneumatically operated door controlled by the operator on the front platform. The objection to this method of operation was that the door was open much longer than required for passengers to get off. It thereby invited the non-paying rider to use this door for his entrance. In cold weather, moreover, a considerable amount of heat was wasted. The greatest objection, however, was the fact that it was possible for the operator to close the door at the wrong time, catching the outgoing passenger in the door and thus leading to accident claims and delays in service.

The development of the automatic treadle door makes it possible to use the circulating load in one-man operation with these objections entirely avoided. Both the center-exit type car and the car with platforms front and rear lend themselves to this method of controlling pasengers in one-man service. The front entrance and center-exit type car is usually arranged with double front doors for rapid loading, while both center doors are equipped with treadles for rapid unloading. Where cars of this type are run through congested areas and where the loading is apt to be heavy at certain corners during peak periods, a street faretaker's valve is provided for one of the exit doors so that passengers can be loaded at both the front and center doors.

The car with end platforms can be arranged in several ways, depending entirely upon conditions. The small single-truck car, for instance, which is generally used on lines having light traffic, is most frequently equipped with a single entrance door at the front and a single exit door of the automatic treadle type at the rear. If conditions warrant it a faretaker's valve can be provided for rear loading.

On the larger double-truck cars it has been found that an entrance and an exit on the front platform are desirable in addition to the exit at the rear. It has also been found that a treadle for the front exit has the same advantages as the treadle used at the rear.

In some cases where the cars are used to handle extremely heavy traffic, it has been found necessary to have two doors on the rear platform. One is the treadle exit door, and the other is an entrance door controlled from the street faretaker's valve on the outside of the car. If, at times, it is thought desirable to use this same car in two-man service, a conductor's valve is provided so that the door can be controlled by him from the inside of the car. This latter arrangement provides for either one-man or two-man operation and, as it can be used with equal facility in either type of service, it constitutes a highly flexible unit.

In fact, more than 4,500 of these treadles are now in use on cars operated in some half a hundred cities. These cars are traveling nearly 9,000,000 car-miles every 30 days.

Considerable thought and attention should be given to the construction of the car in and around the doors so that the best possible condition for installation of the door-operating mechanism is obtained. Faulty car construction at the doors will cause poor door operation, high maintenance, excessive wear and frequent adjustments. If the equipment is installed so it is accessible for inspection it is often found that employees will not trouble to keep the equipment in first-class condition.

Wheel and Axle Maintenance at Atlanta*

By J. H. SQUIRES

Machine Shop Foreman Georgia Railway & Power Company, Atlanta, Ga.

WHEN ordering axles we specify a tensile strength of 85,000 lb., and a chemical analysis as per A.E.R.A. standard, E-5-24. Axles are ordered rough turned, of constant diameter, specifying the rough diameter 1/16 in. over the finished diameter. We also specify the finished dimensions as a further check on correctness. The axle is finished all over. In finishing axles we turn to 0.008 oversize at axle bearing and journal bearing seats and roll bearing to correct diameter. We date all axles on end, but no mileage record is kept.

On our modern cars we are using the same axle in three different types of trucks, a total of 170 four-motor cars. This axle is A.E.R.A. standard, 3¾x7 journal. We have about three types of axle thrust collars; the one we like best in split and held together with four bolts. An adjustable screw is provided to engage against the wheel hub.

We use the standard of 10 tons to the inch diameter in pressing on wheels. The allowance for pressing on cast wheels depends upon the character of the metal. The machine operator sizes this up from experience while boring. This usually runs from 0.003 in. to 0.005 in. There is a difference in allowance for pressing on steel wheels as compared to cast chilled wheels, 0.002 to 0.004 in. being maximum allowance necessary to get tonnage required on steel wheels. White lead is used in pressing on.

Wheels are centered by measurements from the end of the axle to the wheel hub. We press wheels to wheel gage 4 ft. 8¼ in., and then press until the gage is loose. This checks tight on high spots on the flange. Track gage being 4 ft. 8½ in., this gives ¼ in. lateral tolerance. It is assumed, of course, that the wheel-gage line is ⅜ in. up on the flange fillet.

The wheel gage is applied at three locations on the wheels to check for warped wheels or spring axle. We find we will need some new wheel gages before long and probably will make them to 4 ft. 8 5/16 in. as recommended in the 1926 Proceedings, and our wheel gage, allowing a tolerance of 1/16 in. under, will be as a minimum 4 ft. 8¼ in.

Cast wheels and a few rolled steel wheels are used on city cars. Our cast wheels are 2⅝ in. tread, ⅞x1 1/16-in. flange. On our cast wheels we aim to get about 31,000 miles on 26-in. wheels and 40,000 miles on 33-in. wheels. We find, however, that on an average we do not quite reach this.

Discarding of wheels is first determined by the judgment of the carhouse foreman, and verified by the general foreman and machine shop foreman. The criterion for removing wheels is soft iron spots appearing through the chill. For city work on cast chilled wheels we do not have a flange limit gage.

As stated before, we do not attempt to keep a mileage record on axles, and discard them only on limitation of wear. Interurban car axles are removed from that service after seven years and placed in city service. The hammer test is given to all axles each time a car comes in for wheels. Limitations of wear gages are then used, which are ⅛ in. undersize on the axle bearing seat, and ¼ in. undersize on the journal bearing seat. Axles are not built up except worn buttons on the ends. When the axle becomes undersize it is turned to the next smaller size.

We have a number of maximum traction trucks, and a few trailers. When an axle becomes too small to use as a motor axle it is turned down to a trailer axle or an idler axle for maximum traction trucks. When an axle is of sufficient diameter for this purpose, but is not long enough, we make two axles out of three; cutting two pieces to sufficient length, a hole is bored in the end of each one and a piece of 1-in. round cold-rolled steel is inserted. Axles are then put together, chamfered, and electric welded. The weld comes about 36 in. from end of axles. We have been following this practice for about three years and have not had a failure.

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Overhauling on a 40,000-Mile Basis*

By A. J. Naquin

Engineer Rolling Stock and Shops
New Orleans Public Service, Inc.

BRIEFLY, this inspection system consists of removing motors, line breaker, circuit breakers, and air compressor from a car that has operated approximately 40,000 miles since its purchase or last inspection; replacing them with units that have previously been put in A-1 condition, and at the same time checking over all car wiring, air piping, brake rigging, door mechanism, trucks, and minor units (such as trolley poles, harps and wheels); replacing or rebuilding everything that is needed to place the car in as good a condition as the day it was first placed in service. A car is held out of service only a fraction of the time that would be required to repair and replace original equipment.

Inspection is carried on under the supervision of a shop foreman and a field engineer. The latter makes all electrical tests, such as resistance measurements, "hi-potting," and motor "running-in" tests. The dipping and baking of armatures and field coils is under his supervision, and all assembled motors must bear his stamp of approval before being placed on a truck under a car.

Resistance measurements are made with a Kelvin bridge ohmmeter. "Hi-pot" tests are made with portable Westinghouse variable voltage transformers which have been built into a convenient testing set. A testing set has been constructed for calibrating line and circuit breakers. Another testing set has been built for the "running-in" of all assembled motors. A complete load testing set is under the process of construction. An air-brake testing outfit is also provided for the testing of air compressors, governors, etc. Babbitt and "half and half" solder temperatures are thermostatically controlled by means of Leeds & Northrup potentiometers. Baking oven temperatures are controlled by Taylor Instrument Company's apparatus in conjunction with a Westinghouse switchboard layout. A small tank filled with hot Oakite solution is used for cleaning motor bearings. All truck parts and other units are thoroughly cleaned before any squaring and tightening up is attempted.

Advantages of such an inspection system are shown by the record of rewound armatures. In 1923 and 1924 there were 201 and 148 wound respectively, as compared with 55 and 36 in 1925 and 1926. That is, a total of 349 against 91. The total number of motors in service is 1,100. New fields used during 1923 and 1924 totaled 473, compared with 123 in 1925 and 1926.

A reduction in personnel in the assembly room was effected when the system was first put into operation. During 1923, six armature and field winders were used. This number was reduced to four in 1924, and further reduced to three in 1925, at which figure it was maintained during the past year. Four armature and field winder's helpers were employed in 1923. Three were used in 1924, two in 1925, and this past year only one helper and one apprentice were needed. This reduction in labor has been partly accomplished by efficient assembly room management. Efficient tools and equipment account for a further allowable reduction, and the quality of the work done since the system was started has permitted this reduced force to maintain its schedule of operation.

A steady reduction in the number of pull-ins chargeable to equipment is being made. This is due to the inspection system having raised all equipment to a more reliable operating condition. Maintenance cost has been reduced to a figure that compares favorably with like costs throughout the country. For the past year our cost was $20.39 per thousand car-miles. It is desirable to have maintenance charges low, but improved service should always be given consideration even at slightly increased cost.

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*Abstract of a paper presented at a meeting of the Electric Railway Association of Equipment Men, Southern Properties, held at Memphis, Tenn., Jan. 26-28.

American Engineering Council Meets in Washington

PRESENTATION and adoption of a definite legislative program covering public works was one of the chief events of the two-day annual meeting of the American Engineering Council held in Washington on Jan. 13 and 14 of this year. The council indorsed the public works measure to be introduced in the House by Representative Adam M. Wyant of Pennsylvania. This bill embodies the essential features of the report of the council's special committee, adopted a year ago, providing for the reorganization and the more effective co-ordination of the public works function of federal government.

A safety and production study made by a committee of the council is nearing completion. While the conclusions have not all been formulated, members of the committee announced one of the important findings: "In practically every industry studied, an upward tendency in productivity is accompanied by a downward tendency in accident frequency." A. W. Berresford, Detroit, is chairman of this committee.

Another report is rapidly being completed by the council's committee on street signs, signals and marking, W. B. Powell of Buffalo, chairman. Co-operation of numerous national agencies has been obtained. The aim of this investigation is to prepare a standard code of street and highway markings that will appeal to various communities.

The meeting terminated with a banquet, at which Charles M. Schwab, president American Society of Mechanical Engineers, and Secretary Herbert Hoover of the Department of Commerce were guests of honor. Both Mr. Schwab and Mr. Hoover delivered notable addresses.

Minority Only Benefits by Parking†

By John A. Miller, Jr.

Associate Editor Electric Railway Journal

ELIMINATION of parking on Fifth Avenue, New York City, during the recent subway strike resulted in an increase of more than 50 per cent in the speed of vehicular movement between 32d and 52d Streets. On June 17 the writer found by careful investigation that the average speed of northbound private automobiles in this area between 3 p.m. and 6 p.m. was about 4.3 m.p.h. On July 28 with anti-parking regulations in effect a second check showed an average speed of approximately 7.2 m.p.h. Other conditions on these two dates were so similar that the elimination of parking must receive the major part of the credit for the improvement.

It has been stated that the capacity of streets is determined by the intersections. That theory is only partly true. The elimination of all crossing movements at grade, of course, would increase greatly the capacity of any street. But such elimination is a dream of the future. For the present we must permit cross movements, and the problem is to move the greatest possible amount of traffic during the period that the intersection is open.

If vehicles move across an intersection in six lines instead of four, the number crossing in a given time is increased 50 per cent. That was what happened on Fifth Avenue when parking was eliminated. On the day when the second of the two checks already referred to was made northbound vehicles crossed the 42d Street intersection in three lines, while on the first day they crossed in only two lines. The same space was available at the intersection on both occasions, but on the earlier date automobiles parked along the curb between 42d and 43d Streets created a bottleneck on the far side of the crossing.

Undoubtedly much can be done to improve traffic conditions at street intersections. The full width of the roadway should be available for moving traffic. Left-hand turns prevent the most efficient utilization of space at an intersection and should be prohibited at heavy traffic points. Cutting back the corners to permit vehicles to turn on a longer radius while yet hugging the curb might prove advantageous in many places. Better control of pedestrian movement certainly would help. All this, however, will do little good if the roadway space between intersections is not used to the best advantage—a condition that does not now exist.

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†Abstract of discussion published in February Proceedings, American Society of Civil Engineers, page 270.

The argument has been advanced that elimination of parking will not create an additional traffic lane because a certain number of vehicles will always be stopping along the curb to pick up or discharge passengers. This argument assumes that these vehicles are now drawing up close to the curb, but such is not the case. Often a solid line of parked automobiles renders the curb inaccessible. Consequently vehicles picking up or discharging passengers stop in a second line in the middle of the roadway. Thus the elimination of parking will actually create an additional lane for moving traffic despite the necessary stopping of occasional vehicles.

It cannot be denied that there is some curtailment of the rights of the individual when parking is restricted, but restriction of individual rights for the common good has been practiced since the beginning of civilization. The no-parking rule is only a new example of a well-established principle. Most cities have forbidden sidewalk obstructions. Today's protest becomes absurd tomorrow. If more people benefit by regulation than suffer thereby, it is clearly justified. Of this the public and not the individual must be the judge.

From all available evidence it appears that the beneficiaries of parking restriction would far outnumber the sufferers. A careless assumption often is made that nearly every one has an automobile and wants to park. The fact is that only a small fraction of the users of the public streets ride in private automobiles. Investigations made by the writer concerning traffic conditions on Fifth Avenue, New York, showed six times as many passengers riding in public transportation vehicles as rode in private automobiles. Traffic checks made elsewhere show similar conditions. Even in Detroit, the greatest automobile manufacturing center in the world, more than three-quarters of the users of the streets ride in public transportation vehicles. Figures from a few typical cities are given below:

PASSENGERS CARRIED BY PUBLIC AND PRIVATE VEHICLES

	Public Transportation Vehicles	Private Auto	Per Cent by Private Auto
Fifth Avenue, New York City	19,224	3,220	13.9
Broad and Market Streets, Newark	38,000	6,000	13.6
Business district, Detroit	57,150	18,281	24.1
Business district, Baltimore	58,859	12,509	18.1
Business district, St. Louis	69,768	17,601	20.1
	243,001	57,611	19.2

An even smaller proportion of private automobilists is shown by investigation made to determine the means of transportation used by customers to reach retail stores. Of 426,688 customers checked at 71 stores in various cities only 153 per cent came by private automobile. Results of these counts are shown in the following table:

MEANS OF TRANSPORTATION USED BY STORE CUSTOMERS, PEDESTRIANS NOT INCLUDED

City	Number of Stores	Public Transportation Vehicles	Private Automobile	Per Cent by Private Automobile
New York, N. Y.	13	34,439	813	2.3
Chicago, Ill.	4	13,549	1,680	11.0*
Detroit, Mich.	27	158,801	36,272	19.1
Cleveland, Ohio	22	69,419	20,313	22.7
Baltimore, Md.	3	38,433	1,712	4.3
Brooklyn, N. Y.	1	28,800	2,640	8.4
Los Angeles, Cal.	1	17,759	2,058	10.4
	71	361,200	65,488	15.3

*Customers questioned in this investigation were specially selected as being of a type likely to have come by automobile.

Not all of the users of private automobiles are parkers. Many are en route and do not wish to stop. Possibly this is why the store counts show a smaller percentage of automobilists than do the street counts. Many others leave their automobiles in garages. It is difficult to tell exactly what proportion of the users of private automobiles actually are parkers. Figures on this phase developed by the four Chicago department stores mentioned in the preceding table show 452 automobiles parked free in public streets as compared with 369 using paid storage space. It is safe to say that not one person in ten really profits by the parking privilege.

No one has suggested that elimination of automobile parking on important streets offers a complete solution of the problem of traffic congestion. But experience has shown conclusively it does afford relief. It can be done at once. The cost is practically nothing. A large majority of the public will benefit by the greater amount of roadway space available for moving traffic.

American Association News

Engineering Executive

BUSINESS of importance was transacted at the second meeting of the executive committee of the Engineering Association held at association headquarters, New York, on Jan. 26. Members present were President Daniel Durie, R. H. Dalgleish, F. H. Miller, W. F. Graves, W. W. Wysor, L. D. Bale, C. H. Jones, P. V. C. See and G. C. Hecker representing J. W. Welsh.

The secretary announced that the finance committee of the American Association approved appropriations for the committees on noise reduction and rail corrugation. It was voted to request the finance committee to approve an appropriation for use in the trolley wire tests being conducted by the committee on power transmission and distribution.

An affirmative vote was cast by the executive committee on the proposal to charge individual members $1 for copies of the annual proceedings, it was announced. Another ballot of the executive committee unanimously approved the formation of two special rolling stock committees, one to review the association's standard journal boxes and the other to establish limits of wear on car equipment.

Several proposals of the way and structures committee were acted on. It was voted to make changes suggested in Manual section W108-23 to bring it into conformity with the American Railway Engineering Association specification for plain bolted special trackwork. In future, it was agreed that wherever a drawing or specification of some other national organization is referred to in the Manual but not included, copies of such drawings or specifications may be obtained at nominal price on request to the executive secretary. It was voted that the proposal to publish the Manual in sections corresponding to the various engineering departments be held in abeyance.

It was voted to make suggested changes in sections W106, W107, W108 and W109-23 be made in the 1926 Manual provided the Manual committee approves. It was voted to combine way and structures special committees Nos. 2 and 5 into special committee No. 2—special trackwork, the personnel to consist of the present membership of the two committees.

For the Manual committee Mr. Dalgleish reported that copy for the 1926 Manual had been approved and sent to the printer. The secretary suggested the printing of 1,000 copies, of which 500 would be bound, the remainder being held for stock and for making paper-bound sections. This action was approved.

Mr. Miller stated that the subjects committee had no report to make. It was proposed to send out letters to all committee chairmen in the near future requesting them to circularize their members for suggestions regarding new subjects. For the rules committee, he reported that the existing rules had been studied, after which a meeting was held on Jan. 24 and 25 at which a draft of the proposed regulations was unanimously agreed upon. He submitted the report of the committee, containing recommendations in favor of a unit method of voting on standards and a letter ballot instead of the oral vote on the convention floor. The proposals were carefully reviewed and unanimously approved by the executive committee as corrected and amended. It was voted that the president be instructed to report to the American executive committee the action taken. If approved the Engineering Association will appoint a committee to make a careful study of plans which might be used for a unit method of voting.

President Durie presented a suggestion that the engineering committees might incorporate in their reports each year a tabulation of improvements and new devices needed by the industry which have not been developed, and that such information be compiled in a pamphlet for distribution among the manufacturers. The suggestion was favorably received and Mr. Durie was asked to see if the proposal could be put in more definite form.

Mr. Dalgleish, chairman of the special committee to co-operate with the United States Department of Commerce, reported on a number of projects along the lines of simplified practice. The recommendation on carbon brushes and brush shunts was approved.

A.E.S.C. PROJECTS

Several American Engineering Standards Committee projects were reported by the secretary, and a number of appointments were announced. J. M. Hipple represented the association at a conference on standardization of electric motors, and stated that a sectional committee on this subject was authorized. W. E. Brown was appointed on the sectional committee on wood poles, vice Leslie E. Delf, resigned, with H. E. Brauning as alternate.

F. L. Aime was appointed on the committee on terminal markings vice C. A. Greenidge, resigned. Announcement was made of the formation of a sectional committee on standards for graphical presentation. H. W. Codding was named as the association's representative. A sectional committee on methods of test of road materials was organized. Proposed federal specifications for chrome yellow and for Portland cement were referred to A. T. Clark and H. H. George, respectively.

The executive committee was advised that the specification for tubular steel poles prepared under the sponsorship of the A.E.R.A. had been approved and printed in the standard form for the A.E.S.C. Copies are available at association headquarters at a nominal price.

A.S.T.M. SPECIFICATIONS

The secretary announced that an attempt was being made to have the American Railway Engineering Association bring its specifications for the manufacture of open hearth girder rails of plain, grooved and guard types into complete conformity with those of the A.S.T.M. and the A.E.R.E.A. so that at the proper time a specification might be presented to the A.E.S.C. Only a few minor changes are needed to do this.

Announcement was made that Mr. Hecker and Mr. Bale as representatives of the association had attended a meeting of the power house committee of the N.F.P.A. at which a start was made in the formulation of rules for protection of electric power houses. A conference committee on electric railway car houses and cars has been organized to consider in particular regulations for hot water and hot air heaters, composed of H. H. Adams, chairman; J. H. Lucas and H. S. Williams.

A joint meeting of the conference committee on bus garages and garage hazards was attended by Mr. Hecker, at which a proposed set of regulations for bus garages was drawn up for further consideration.

A. J. Scaife and L. H. Palmer of the Society of Automotive Engineers have accepted apointment as representatives of that society on rolling stock committee No. 2, motor coach design.

L. D. Bale, W. E. Bryan and H. W. Codding of the A.E.R.E.A. have been suggested to the American Institute of Electrical Engineers for membership on the committee on switchboards for power and light.

The secretary announced the resignation of M. B. Rosevear from the A.E.S.C. sectional committee for the revision of the National Electrical Safety Code, parts 2 and 4. His resignation was accepted with regret and the president was authorized to appoint a successor.

The need for revision of the constitution and by-laws was discussed. Changes may have become necessary on account of the new organization and procedure. The president was authorized to appoint a sub-committee to investigate the need for such revision.

Claims Executives

PLANS for the October meeting of the Claims Association were made by its executive committee at a meeting held in the offices of the Memphis Street Railway on Jan. 28. Those present were: President C. B. Proctor, Memphis; W. F. Weh, Cleveland; B. F. Boynton, Portland, Ore.; W. R. Robinson, Cincinnati; G. T. Hellmuth, Chicago; S. J. Herrell, Knoxville; L. F. Wynne, Atlanta, Ga.; H. V. Drown, Newark, N. J.

It was proposed to include in the program for the annual meeting a number of papers showing the actual accomplishments of electric railways in accident prevention work. Medical and surgical work are also to be given a place on the program, and a joint session is planned with the Transportation and Traffic Association, as has been customary with this group in recent years.

Mr Proctor exemplified his Southern hospitality by entertaining the early arrivals with drives around the city of Memphis. He was also host at a dinner given the executive committee at which officers of the Memphis Street Railway were present.

Further details of the program will be taken up at a later meeting of the executive committee of the Claims Association.

Heavy Electric Traction

ORGANIZATION of the heavy electric traction committee of the Engineering Association was completed at a meeting held at association headquarters in New York on Jan. 27. Those present were H. F. Brown, New Haven, Conn., chairman; J. M. Bosenbury, Springfield, Ill., vice-chairman; A. H. Armstrong, Schenectady, N. Y.; Morris Buck, New York City; H. W. Cope, Pittsburgh, Pa.; A. H. Daus, Chicago, Ill.; J. C. Davidson, Schenectady, N. Y.; E. P. Chase representing J. V. B. Duer, Altoona, Pa.; M. W. Manz, Mansfield, Ohio; G. C. Hecker representing J. W. Welsh, New York City, and F. H. Miller, Louisville, Ky., sponsor.

Assignment of subjects to the various sub-committees was the principal business of the meeting. In addition to the subjects assigned by the association, it was decided to continue the collection of data on electrified steam railroad mileage and electric locomotives.

It is planned to hold the next meeting of the committee in New York City during April.

Special Reports Available

SPECIAL reports are being prepared by the Bureau of Information and Service of the American Electric Railway Association and will be available to member companies upon request, as follows:

Bulletin No. 124. Motor Bus and Truck Rules and Regulations Prescribed by Public Utility Commissions.—A collection of all the orders issued by the regulatory commissions of the various states, prescribing rules and regulations for the operation of buses and trucks in common carrier service, with an analytical index permitting ready reference to subjects covered by the orders. The orders cover such subjects as size and weight restrictions on buses and trucks, standard equipment prescribed, liability bonds and insurance requirements, rules for making applications for certificates of convenience and necessity, requirements for drivers, etc.

Bulletin No. 125. Relief from Paving Burdens.—An up-to-date review of the developments in the movement to obtain relief from state and municipal requirements to pave, repave or maintain the pavement along the electric railway's tracks, with accounts of leading cases in which relief has been obtained. All of the data contained in the previous bulletins on this subject have been brought together in this bulletin, and a careful index has been prepared covering all cases of paving relief.

Bulletin No. 126. Trend of Trainmen's Wages, 1927.—Shows for a large group of companies the maximum wage rate paid trainmen, the number of years of service necessary to reach this maximum, and the number of trainmen employed for each of the years from 1914 to 1926, inclusive, and also the rates paid as of February 1, 1927.

Bulletin No. 127. Trend of Electric Railway Fares, 1927.—Shows the rate of fare in effect in all cities having a population of 25,000 or more for each year from 1917 to 1926, inclusive. In addition, it shows the average cash rate of fare in 272 cities during the same years, and also the number of cities in which each rate of fare was in effect in each of these years.

In addition to the above the following supplements have been prepared, bringing the information they cover down to February 1, 1927.

Supplement No. 17 to City and Interurban Fare Bulletins Nos. 41 and 42.

Supplement No. 4 to Bulletin No. 108, Wages of Trainmen.

Supplement No. 4 to Bulletin No. 109, Wages of Bus Men. Cost of Living Studies (Bulletin No. 128).

The News of the Industry

New St. Louis Fare Schedule Suspended

The Missouri Public Service Commission on Feb. 3 suspended until June 7 the fare schedule of the United Railways, St. Louis, Mo., under which the company proposed to raise its fare from 7 cents to 8 cents or two tokens for 15 cents, effective on Feb. 6. T. E. Francis, counsel for receiver Rolla Wells, states that the federal court will be asked for an order setting aside the commission action and permitting the proposed rate to go into effect. An appeal will be based on grounds that the present fare schedule is confiscatory and in violation of the constitution.

Seattle Warrants to Be Cashed Without Discount

Upon showing by the City Council of Seattle, Wash., that the salary warrants of the employees of the Seattle Municipal Railway will be cashed without discount, Judge Calvin S. Hall in the Superior Court has continued argument of J. G. Von Herberg's application for a restraining order in his suit against the city until Feb. 7. Mr. Von Herberg is asking for an order restraining the city from making further payments on the railway purchase until operation costs are paid. The court stipulated that while he granted the city's request for non-interference at this time, the money now in the bond redemption and interest fund must remain in the jurisdiction of the court. Meanwhile, the $118,000 payroll warrants paid to employees on Dec. 26 have been cashed, either at the banks or department stores of the city, without discount.

Mayor Bertha K. Landes presented to the court an affidavit setting forth efforts made to obtain a revision of the purchase contract with the Puget Sound Power & Light Company, and submitted a telegram from A. W. Leonard, president of the company, who is en route West from a meeting of the Stone & Webster directors, with a proposition to present to the city in regard to the railway contract.

Corporation Counsel T. J. L. Kennedy pleaded for a policy of non-interference, pointing out that the railway will be off the warrant basis by May 20, a period of five months and four days. He accused Mr. Von Herberg of being an enemy to "both laborers and taxpayers."

Attorney for Mr. Von Herberg told the court the action was brought in good faith and questioned the authority of the city to issue interest-bearing warrants when there is no money in the warrant fund. He called attention again to the statute which says labor must be paid first. He declared the power company is not interested and not properly a party to the suit, as it has assigned its bonds. He also criticised the payment of damage claims of the railway out of the general fund, saying they should come from the railway fund.

Seattle's "Fourteen Taxpayers," who in 1922 protected the city's general fund from invasion by the Municipal Railway, came back into the situation when Judge Hall granted them permission to appear as "friends of the court" in the Von Herberg suit. It is declared that the taxpayers have resolved to back the Von Herberg suit on the ground that labor and operating expenses, under the law, must be superior to bond redemption.

Chicago Grants Expire; $171,188,000 Bonds Defaulted

Situation Affecting Chicago Surface Lines Reviewed as Matters Stood on Day of Expiration of Old Franchises—Slow Progress of New Negotiations—Coach Company Renews Its Bid

FRANCHISES granted twenty years ago to the four companies which comprise the Chicago Surface Lines expired at midnight on Jan. 31. Simultaneously the six months extension ordinance voted by the City Council on Jan. 26 became effective, thus assuring continuance of unified operation with the same rate of fare, universal transfers and the same compensation to the city.

While the change does not affect street car riders, holders of the companies' securities are denied the principal now due them. Interest on all of these securities was paid this week, but payment of the principal will have to await agreement on a new franchise. The aggregate default of the railways' securities—probably the largest in the history of the industry—will be $171,188,475, approximately $102,000,000 of which represents Chicago Railways obligations. This default has been anticipated ever since it was known there would be a delay in agreeing upon a new franchise for the companies.

About 50 per cent of the Chicago first mortgage bondholders are reported to have placed their securities in the hands of a protective committee.

Actual demand for the payment of $55,655,000 first mortgage gold bonds was made within ten hours of the expiration of the franchise period upon the Chicago Railways by the Harris Trust & Savings Bank, acting as trustee. In announcing the default, the company replied that it was in the hands of receivers. Holders of $40,000,000 worth of junior bonds of the company, consisting of consolidated mortgage bonds, series A and B, purchase money mortgage bonds and adjustment income bonds, which also fell due Feb. 1, met the same answer when payment was demanded the following day.

The receivers for the company have declared their intention of joining with the Harris Trust & Savings Bank and the first mortgage bondholders' protective committee in asking the federal court that the first mortgage on the property be foreclosed. It is expected that the protective committee, headed by Albert W. Harris, president of the aforementioned bank, will subsequently institute proceedings for a sale of the property. The Chicago Railways has a valuation of $94,000,000. This will open the way for a reorganization over which the bondholders will exercise strong control. As a reorganization without the franchise power to operate would be of very limited value, the bondholders are also expected to exert a powerful influence in the traction negotiations which were resumed by the local transportation committee of the City Council on Feb. 3.

Holders of the $68,270,000 first mortgage bonds of the Chicago City Railway and the Calumet & South Chicago Railway are apparently satisfied with the situation and no move has been made to apply for a receivership. While there is no money in the treasuries of these companies to meet the demand for the principal sum, interest on the bonds is available and will be paid promptly, according to Leonard A. Busby, president of both companies. The $20,616,000 principal of collateral trust bonds of the Chicago City & Connecting Railways, the third member of the south side group, was defaulted on Jan. 1.

ORDINANCE NEGOTIATIONS DEFERRED

Further consideration of the new consolidation ordinance was postponed on Jan. 29, awaiting action of the Chicago Railways receivers appearing in the federal court to default on their mortgage bonds. In the event of the filing of a bill for the foreclosure of the first mortgage this week, the bondholders will be directly injected into the negotiations and the issue between the city and companies may become more clearly defined. At the instance of President Busby, the Aldermen agreed to defer discussion of the clause in the draft providing for the naming of the local regulatory commission. A commission of five members, all named by the Mayor subject to approval by the City Council, appears to be favored by the members of the committee, while company representatives insist that at least two commissioners should be named by the company and another selected jointly. A bill authorizing Chicago to appoint a commission to regulate, supervise and control its own transit affairs was introduced into the lower house of the state Legislature on Jan. 27 by Representative Michael R. Durso.

The committee tentatively agreed at its meeting on Jan. 29 to relieve the new company of certain non-transportation expenses, including the cleaning of its right-of-way and part of the burden of paving between the tracks.

SUBWAY QUESTION REVIVED

Chairman Joseph B. McDonough announced at the meeting that he would soon ask the committee to order working specifications made preparatory to building subways by special assessment. Steps in this program, according to Mr. McDonough, will be, first, a decision on the kind and size of a supervisory staff; second, a rough estimate of the cost of plans; third, hearing of property owners and other citizens, and fourth, approval of the program by the City Council as a whole. An estimate of six months was placed on the length of time which will probably be required to prepare plans for the subways.

Questions of valuations of the various properties and rates of return, over which a deadlock seems to have been reached, were briefly discussed. Cyrus H. Adams, attorney for the Chicago Rapid Transit Company, said he would be able to offer a valuation of the elevated lines at an early date.

Growing indifference on the part of members of the local transportation committee is regarded as endangering the hope that the consolidation ordinance, many vital clauses of which are still undecided, will be completed and approved by the City Council in time for submission to the voters at the April mayoralty election. With many of the Aldermen coming up for re-election on Feb. 22 it is considered unlikely that much attention will be given to traction matters in the intervening weeks. It has been estimated by Corporation Counsel Francis X. Busch that three solid weeks will be required before the proposed ordinance is ready for presentation to the City Council.

MOTOR COACH HEARINGS RESUMED

The Chicago Motor Coach Company on Jan. 27 renewed its bid for a term franchise to operate comprehensive city-wide bus service. The bus company's proposal has been in the hands of the Council sub-committee since it was first presented to the city on Dec. 9. The Aldermen have been assured that so long as a reasonable return is guaranteed to the company the terms of the ordinance can practically be dictated by the city.

At the hearing during the week ended Feb. 5, called to receive further details of the proposition, James A. Emory, vice-president of Ford, Bacon & Davis, presented the results of elaborate engineering studies together with supporting data, maps and charts showing how the plan would be carried out.

The federal court on Feb. 3 ordered foreclosure proceedings on Feb. 9 against the Chicago Railways, on petition of the Harris Trust & Savings Bank. Friendly action was not contested. The court reappointed the three receivers named last month and ordered the lines operated as required under the city contract. Similar action by the junior bondholders is expected soon. The company has twenty days to reply. A formal hearing will be held in the meantime. The consolidation ordinance hearing has been postponed indefinitely.

Railways Robbed by Tax Collector

Economic retrenchment in New York State should begin in the public school system and the tax burden should be equalized by distributing the levies to protect the electric railways, which "are being robbed." These are the views of John J. Merrill, expressed by him at the National Republican Club in an address on Jan. 26. Mr. Merrill spoke impromptu at New York. Later he talked with the correspondent of the ELECTRIC RAILWAY JOURNAL at Albany on the same subject. The subjoined comment is believed to represent his views correctly:

> Street railroads are taxed to death. They pay a property tax on all properties; they then pay to the state of New York 1 cent on every dollar of gross income they take in; they then pay a special franchise tax for the privilege of occupying public places. They are also paying paving taxes. The average amount taken away from the street railways for paving the streets of municipalities has been in excess of $2,500,000 a year. This is, of course, a relic of the old days when the horse cars actually did some damage to pavement, but that is not so now.
>
> It is true the street railways should pay any expense occasioned by heavier construction needed to carry their rails and for whatever repairs are made necessary by their operation upon them. Today, subject to all these taxes, they are thrown into competition with bus lines which are practically paying nothing, so to speak, toward the support of government; at least it is so slight it is nearly negligible. Of course, incorporated bus lines are supposed to pay a gross earnings tax, but they do not pay any special franchise tax and they have little if any property which gets onto the tax rolls. There is no class of taxpayers in the state so heavily burdened by taxation as the street railways.

Mr. Merrill is regarded as one of the foremost experts in the state of New York on the practical working of the corporation tax law. He has been connected with the tax system of the state since 1894. In November, 1917, he was appointed a tax commissioner by Gov. Charles S. Whitman to fill an unexpired term, and in February, 1918, he was reappointed for a full term. On Jan. 26, 1925, Mr. Merrill was reappointed by Governor Smith for a term ending Dec. 31, 1926, and in January of this year he was again reappointed by Governor Smith as a member of the tax commission for a term of six years.

Mr. Merrill was born at Potter Hill, R. I., on Nov. 14, 1861. He was educated in the public schools, Hopkinton Academy and Alfred University, from which institution he was graduated in the philosophical course in 1884. He received the degree of master of philosophy in 1887.

Wage Petition in Indianapolis to Be Considered

A petition of three employees of the Indianapolis Street Railway, Indianapolis, Ind., asking for an increase in wages, changes in the procedure of future requests for wage adjustments and the reinstatement of employees who went on strike last July 4, is being considered by James P. Tretton, superintendent. He indicated there probably would not be immediate action on the matter and officials of the company declared the financial condition of the company would not permit of pay increases.

A wage scale of 60 cents an hour for those employed less than six months; 63 cents for those from six months to a year, and 65 cents for those with the company more than a year, was requested. The present scale is 37 to 42 cents over a five-year period. In addition to the regular wage increase asked, operators of one-man cars would receive 7 cents additional under the petition. A minimum monthly wage of $100 is asked.

Ten-Cent Cash Fare in Syracuse

The Public Service Commission on Feb. 4 authorized the New York State Railways, effective on Feb. 10, to establish a 10-cent cash fare with ten tickets for 75 cents on its Syracuse lines.

The new rate was determined upon a tentative rate base of $9,426,739 as of Sept. 30, 1925. Based upon revenue passengers carried for the year ended Sept. 30, 1925, and under the new fare rates authorized, estimating a 2 per cent decrease in travel, 70 per cent of riders using tickets and 30 per cent paying cash fares, the increased revenue, on the tentative valuation above, will give an estimated return of 7.58 per cent upon such value of the property used in giving service on the Syracuse lines.

Campaign to Restore Michigan Suburban Line Continues

Another meeting of the residents in the villages and communities served by the Grand Rapids, Holland & Chicago Railway who are seeking to finance the operation of the proposed United Suburban Railway was held on Feb. 2. A large crowd packed the schoolhouse at Grandville.

H. T. Slaght, banker and chairman of the movement to rejuvenate the road, said that nearly 25 per cent of the $70,000 needed to finance the proposed new company and the operation of the contemplated line between Grand Rapids and Jenison has been raised.

The campaign for stock subscriptions will be continued for one more week. Final report on the subscriptions will be made at another meeting to be held in Grandville during the week ended Feb. 12.

The railway committee is distributing a circular among residents of the suburban communities that answers many questions asked by prospective subscribers and is expected to simplify the work during the last week of the drive to obtain the $50,000 still necessary to assure the project's success.

$2,050,000 to Be Spent in Cleveland

The expenditure of $2,050,000 is contemplated in the program of the Cleveland Railway, Cleveland, Ohio. This would include at least 100 new cars, 25 additional buses and terminals and power units. The completion of the West 117th Street car yards and switching terminals, the completion of the new terminal on Kinsman Road, near Lee Road, and two new power substations, one on the west side and one on the east side, are included. The company may even experiment with three-car train operation.

Abandonment of the present Windermere carhouse on Euclid Avenue, East Cleveland and sale of valuable frontage and rebuilding of terminals on a much larger tract of land which the company has in that vicinity also are planned.

It is proposed to place company stock on the market for this purpose. This would be the first time in nearly ten years that stock has been sold to finance a similar program of improvements.

The annual reports show the company in the best financial condition for some time. The interest fund deficit has disappeared and been replaced by a balance of $212,000.

While some bus lines are understood not to be profitable, the entire operation is regarded as a valuable supplement to rail service.

Higher Fare Sought by Syracuse & Eastern

The Syracuse & Eastern Railroad applied to the Public Service Commission on Jan. 26 for authority to increase its fare in Syracuse, N. Y., by establishing two fare zones, with a fixed rate in each zone at 10 cents. Fare rates on the lines within Syracuse vary from 7 to 14 cents cash.

The petition alleges that the value of the company's property used in giving service in Syracuse is more than $350,000 and that the gross operating income from the entire road, including the 11 miles of line in Syracuse and under existing fare rates, was $1,068 in 1926. The return, the company alleges, did not exceed 2 per cent in 1924 or 1 per cent in 1925 and 1926.

There will be a hearing in Syracuse on Feb. 4 on a complaint by Mayor Hanna of Syracuse against the railroad for alleged violation of law in charging two fares within the city following recent annexation by the city of the Genesee Manor section.

Los Angeles Fare Hearing Adjourned

Hearing on the application of the Los Angeles Railway, Los Angeles, Cal., for an increase in fares has been adjourned until May 17 so that the city's attorneys as well as the railway's attorneys may have time to prepare more evidence. At a hearing on Jan. 13, before State Railroad Commissioner Louttit, Jess Stephens, city attorney, and engineers of the Board of Public Utilities led the opposition to the proposed rate increase from 5 cents to 7 cents and a ticket fare of 6¼ cents. An important point raised by Attorney Stephens was the matter of interchange of transfers between the Los Angeles Railway and the Pacific Electric Railway. Attorney Haskins for the railway agreed to confer with the Pacific Electric Railway officials to discover on what basis such a contract could be made. It was the contention of the witnesses that the present 5-cent fare was too low to yield just compensation for the use of the property involved over and above the amount necessary to pay taxes and operating expenses.

The hearing of the Los Angeles Railway application came on the heels of the Pacific Electric Railway's petition for a 7-cent and a 12-cent local fare and an increase on its interurban lines, as outlined in the JOURNAL for Jan. 22. The City Council in both cases opposed the move.

Jacksonville Property Offered to City

The property of the Jacksonville Traction Company, Jacksonville, Fla., has been offered for sale to the city by J. P. Ingle, manager of the company, but the City Council tabled a motion that a legislative bill be prepared to authorize the city to make the purchase.

In reading a letter offering the railway for sale, Mr. Ingle did not set a price, and in his motion Councilman Barrs asked that the company manager set a figure on the value of the property. Councilman Edward S. Hemphill, proposing the motion to table the matter, declared that the bone of contention was the valuation of the company.

Among other things Mr. Ingle said:

> Five months has now passed since the franchise ordinance was first introduced and to date nothing has actually been accomplished toward drawing up a franchise. I think also I can accurately state that the citizens' committee is more interested in delaying action on a franchise than they are in drawing up one, and the laws and rules committee seems perfectly willing for the citizens' committee to pursue their course of postponement and delay. Whether this policy of postponement and delay will continue indefinitely, I of course cannot say, but at this time I can see no reason to suspect any change unless it be for the citizens' committee to propose such a franchise as will be impossible for us to accept. This will in its effect mean delay and postponement of a settlement of this franchise question.
>
> As the Council knows, before the city could purchase and operate the railway, it would be necessary to obtain special authority to do so from the Legislature. The Legislature meets in April, and there should be no trouble in obtaining the passage of a special act authorizing the city to purchase and operate the railway. We would be glad to join the city in asking the Legislature to pass such an act if the Council desired our assent or assistance.
>
> Action looking to the possible purchase of the railway by the city, furthermore, need not in any way interfere with the drawing up and passage of a franchise by the Council, as such a franchise could contain a provision requiring the company to sell its property to the city at any time within a stated period, if the city decided to purchase.
>
> In coming before your honorable body and again bringing this matter to your attention, I do so largely in the interest of the tens of thousands of citizens who daily use our street cars as a necessary means of transportation. Their interests should certainly receive your earnest attention. Unless and until your honorable body takes some constructive steps toward either putting us in a position where we can supply additional service, or by purchase of the property, giving this additional service yourselves, the car rider is not going to get the service to which he rightfully feels he is entitled.

Arranging for San Francisco's Municipal Railway Bond Issue

By Feb. 1 all of the preliminary details for a bond issue election to finance proposed extensions to the San Francisco Municipal Railway, San Francisco, Cal., will probably be completed. Announcement to this effect was made on Jan. 20 by Supervisor Shannon, chairman of the public utilities committee of the Council.

The committee now has under consideration the extension program of City Engineer O'Shaughnessy, covering five major projects and costing about $3,500,000. To this program others have been suggested by citizens and improvement clubs, the total of which is approximately $2,000,000.

Many proponents of extensions were before the committee on Jan. 20, which was the last day that public hearings on extensions will be held. Among the districts that were heard were Bayview and Quintara Street.

Relief from Paving Charge Up in Detroit

The Street Railway Commission at Detroit, Mich., is considering the question of whether to renew efforts to relieve the department of street railways of the cost of paving between the tracks, as proposed by Del A. Smith, acting general manager of the department. In recommending that the City Council be asked to pass an ordinance embodying the idea, Mr. Smith said the change would save the system $500,000 a year, and that in recent years 46 street railways in the country have been freed of such paving requirements.

City Council of Boston Opposes Public Control

In the pending discussion over the proposed extension of public control of the Boston Elevated Railway, Boston, Mass., the City Council of Boston assumes an adverse attitude. It has voted to oppose further extension of such control, but has taken under consideration Representative Luke D. Mullen's plan for state purchase of the property and the construction of a subway in Charlestown and Roxbury in place of the present elevated structure.

Campaign to Protect Public.—D. W. Henderson, superintendent of the Seattle Municipal Railway, Seattle, Wash., has started an intensive safety campaign to protect the public. Street railway patrons will be warned by conductors and motormen of the traffic dangers. Meetings will be held at the carhouses at which means of lessening dangers in traffic will be discussed.

Accident Record Compiled for Moral Effect.—General Manager Smith of the Beaver Valley Traction Company, New Brighton, Pa., has notified his employees that if they want their accident record for 1926 they may have it compiled by name, years in service, and even by date, time and place. Mr. Smith believes that if an employee knows his record he will be most cautious and learn to do his job in the efficient way, without accidents. Each morning a chart is brought to his desk showing the comparison with the year, month and day previous. Then there follows a report of each accident by name of operator, kind of accident and place.

Interurban Men Receive Increase.—As a result of negotiations between the trainmen's labor adjustment committee and officials of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., interurban trainmen have been granted an increase of 5 cents an hour The increase is retroactive to Jan. 1 and with renewal of present working conditions extends to June 30. The wage agreement for city and suburban trainmen has been extended without change.

Favor Railway Service.—Residents along the South Mason Street line of the Wisconsin Traction, Light, Heat & Power Company, in Appleton, Wis., attending the last meeting of the Council voted in favor of continuing the present railway service instead of abandoning it in favor of bus service. The issue grew out of the company's refusal to move its tracks to the center of the street. The dispute ended suddenly, however, when the company promised to put its tracks in shape, providing no great additional expense would be involved.

Resolution Scores Commission Supervision.—The City Council of East St. Louis, Ill., on Jan. 24 passed a resolution presented by Mayor M. M. Stephens asking members of the Illinois Legislature from the 49th District to vote in favor of a bill providing for city supervision of public utilities instead of supervision by the Illinois Commerce Commission. The resolution is in keeping with the legislative program of the Illinois Municipal League, which would abolish the Illinois Commerce Commission.

City and Tramway Disagree on Fare Change.—The City Council of Colorado Springs, Col., recently denied the Colorado Springs & Interurban Railway a change of fare methods. The company is charging 8 cents cash with two tickets for 15 cents. It asked that it be allowed to make the fare fourteen tickets for $1, or 10 cents for a single cash fare. The Council in denying the change feels that few people would care to invest $1, therefore the change would practically mean a 10-cent fare.

New Attack Affecting One-Man Operation.—The city of Buffalo, N. Y., has attacked the International Railway under a new city ordinance adopted some time ago including certain regulations for the operation of one-man cars. The ordinance, aimed to curb the operation of one-man cars on congested streets, provides that operators of these cars cannot engage in other duties when the car is in motion. One motorman has been arrested in a test case. He is accused of making change and issuing transfers while the car was in motion on a congested street. The penalty for each violation is a fine of not less than $25 nor more than $50. The railway says it will question the validity of the ordinance and that it is prepared to carry the case to higher courts if there should be a conviction.

Recent Bus Developments

Temporary Injunction in Louisville

Court Restrains Competitor of Louisville Railway—Contention of Counsel for Company Reviewed—Briefs to Be Filed at Once—Issue of Great Importance

IN THE suit of the Louisville Railway against the People's Transit Company, Louisville, Ky., asking an injunction to prevent the latter company from operating buses on local streets on which there are railway lines and within a reasonable distance to either side of such streets, Judge William H. Field of the Jefferson Circuit Court on Jan. 28 granted a temporary injunction. The railway at once deposited a bond of $25,000 to indemnify the bus company against loss, in event the suit should be decided against the railway in the Court of Appeals.

As a result of the injunction the People's Transit Company withdrew its buses from Broadway at 4.30 o'clock on Jan. 28 and carried the case to the Court of Appeals, where it was brought up on Jan. 29 at 9 o'clock. The upper court refused a decision in the appeal until briefs were filed and more light cast on what the upper court referred to as an "important case." Attorneys for the railway had until Feb. 1 to file briefs, and those for the bus company an additional day.

Attorneys for the bus company contended that city and state licenses were all that were necessary to operate the line. Those for the railway contend that the bus operators have no franchise and are interfering with a franchise held by the railway.

Buses Must Have Franchise

The Louisville Railway has a franchise giving it the railway privilege on Broadway. Attorneys for the bus line contend that if the company's position is sustained a taxicab company or any one carrying passengers for hire would have to have a franchise and, perhaps, stay off of certain streets. It was contended that this would also stop all jitneys. It was also contended that if the lower court is upheld, the Louisville Railway would have to secure franchises for operation of its Kentucky Carriers Company chain of buses, operated as feeders to the Louisville Railway in suburban territory.

Judge Field held that buses can be operated on local streets only under franchise, and that a company operating buses without a franchise would be doing so illegally.

The People's Transit Company on Jan. 17 started its Broadway line with six buses. It has been telling about plans for several other lines to be started shortly.

Arguments on the motion for a temporary injunction were made by Mr. Dodd, representing the bus owners, and Churchill Humphrey, general counsel for the railway. Four points were involved in the litigation, Mr. Humphrey pointed out in his argument. The court sustained him on each point.

The principles involved were cited as follows:

> 1. The use of the highway by a bus operating as a common carrier of passengers for hire, over a regular route, according to a fixed schedule and between fixed terminals is a special or privileged use as distinguished from an ordinary or general use.
> 2. There can lawfully be no special or privileged use of the streets of a Kentucky municipality except under franchise rights.
> 3. A citizen and taxpayer may complain of an unlawful street user.
> 4. A franchise holder whose rights are infringed by the unlawful highway user of a competitor may complain of such unlawful highway user.

In arguing the first point Mr. Humphrey contended that the use of the highway by a bus operating as a common carrier of passengers for hire, over a regular route, according to a fixed schedule and between fixed terminals is a special or privileged use as distinguished from an ordinary or general use. In support of this contention Mr. Humphrey cited Section 164 of the Kentucky constitution, which provides that such use can only be secured by franchise, and that before granting such franchise or privilege the city or municipality must offer the franchise for sale to the highest and best bidder.

Counsel for Company Quoted

Mr. Humphrey is reported to have said:

> "The contention of the plaintiff is that the defendant's use of the highway is not a natural or ordinary use, but is an extraordinary or privileged use. If this use of the highway be an extraordinary or privileged use, then, obviously, it requires a franchise. Let us inquire, then, as to the use defendant bus company is making of the highway.
>
> The defendant is operating on Broadway from the west end to the east end. It is running buses as a common carrier of passengers for hire, according to fixed schedules, along the Broadway route, between fixed terminals. It is, of course, using the city street, a public highway, for this purpose. Is this use of the city street an ordinary use, or is it a privileged use?
>
> It would be difficult to find any point in our jurisprudence upon which there is such a wealth of authority and such unanimity of opinion. We do not wish to burden the court with a discussion of precedent, but it is necessary to point out how universal is the rule that the use of the public highway by a common carrier is not the ordinary use of the highway, but is a special or privileged use. In other words, an individual or corporation has a natural right to the ordinary use of the highway, but has no right to the privileged use of the highway, except under sovereign grant.

In summing up the facts on point one, Mr. Humphrey declared:

> The use of a highway by a common carrier of passengers for hire, operating between fixed terminals, over designated route, and according to a fixed schedule, is an extraordinary or privileged use of the highway. The Court of Appeals of Kentucky has said so. The Supreme Court of the United States has so decided, as have

> also the highest courts of the following jurisdictions; Alabama, Colorado, Delaware, Georgia, Idaho, Indiana, Iowa, Kansas, Louisiana, Massachusetts, Michigan, Mississippi, Montana, New Jersey, Ohio, Oklahoma, Oregon, Texas, Utah, Vermont, Virginia, Washington and West Virginia.
>
> It cannot be necessary to amplify this argument. It would take more vanity than the writer of this brief can muster to think that he could add anything to the careful and reasoned discussions of the 25 jurisdictions which have gone so thoroughly into the question.

In support of point 2, Mr. Humphrey contended there can be no special or privileged use of the streets of a Kentucky municipality except under franchise rights. There is probably no point better settled in Kentucky, he said, than this one, pointing out a long list of precedents to this effect developed by the Court of Appeals.

General Council Must Pass on Matter

In summarizing point 2, Mr. Humphrey said that in order to acquire the privileged use of the streets of Louisville a franchise authorizing such privileged use must be created by the General Council, which must be sold at public auction and the person or corporation claiming the right must buy at such sale. None of these conditions has been complied with, he said, in the case involved.

In discussing the other two points raised by the railway, Mr. Humphrey said, in referring to point 3, any citizen or taxpayer may complain of an unlawful street user. It has been held in Kentucky, he said, that a citizen and taxpayer may complain of the unlawful use of the city streets by a concern operating without franchise rights.

On point 4 he indicated that a franchise holder whose rights are infringed by the unlawful use of a highway by a competitor may complain of such unlawful highway user, and cited the case of the Reo Bus line against the Big Four Bus line to support his contention that a franchise is necessary to operate on the public highways. Again he was quoted:

> The case at bar presents a curious state of facts. The Louisville Railway is one of the largest taxpayers to the city of Louisville. Not only has it acquired franchise rights and assumed franchise obligations, but also it has constructed and maintains its own track and roadbed and, in addition, it is paying, by taxes and as a direct obligation, for the surfacing of the city streets over which its competitor, with no obligation, or even idea, of general service, is attempting to raid its only profitable lines to the breakdown of the general transportation system in Louisville. Where we have a constitution providing that operating obligations must accompany operating rights, it hardly seems to us that a situation will be allowed to continue whereby the established, responsible, obligated company must pay taxes to construct and maintain streets upon which its unestablished, irresponsible and unobligated competitor can destroy it.

Bus Counsel's Contention

In his argument against the injunction, Mr. Dodd contended that buses are different from street cars, and that their use of the streets or highways is not a special or privileged use, as contended by the railway and that they therefore do not require a franchise before they can operate. Buses are not required to secure a franchise, he contended, any more than the jitneys or taxicabs, which have undisputed use of the streets day and night.

Consent Sought for Independent Operation in Buffalo

The Buffalo Motor Coach Company, Inc., which has obtained franchises from the City Council of Buffalo, N. Y., for the operation of three bus lines in the city, has applied to the Public Service Commission for a certificate of convenience and necessity so that the lines can be put in operation as soon as possible.

Ernest M. Howe, Detroit, president of the company, says eighteen buses will be used at the start on routes 1 and 2 and seven buses will be used on route 3. The buses will be of the single-deck, one-man, pay-as-you-enter type with seating capacity for 29 passengers.

An 8-cent cash fare will be charged with free transfers to connecting bus lines of the company.

Several of the routes will serve territory now reached with local lines of the International Bus Corporation, a subsidiary of the International Railway, which is opposing the new corporation before the Public Service Commission. The commission has not yet fixed a date for a hearing on the proposed right to operate in Buffalo.

Bill Would Tax Bus Companies

Bus companies operating in St. Louis, Mo., would be required to pay a 5 per cent tax on their gross receipts if a bill presented to the Board of Aldermen by Alderman Schwartz of the Twentieth Ward is passed and signed by Mayor Victor J. Miller. The measure was introduced at the request of Comptroller Louis Nolte and Director of Streets and Sewers Robert B. Brooks. They contend that the present tax of 3 per cent of gross receipts is inadequate to repair the damage caused to streets by the buses. Companies operating only part of their lines in the city would pay in proportion to the mileage in the city and on their entire system.

W. H. Vanderbilt Acquires Bus Company in Connecticut

The controlling interest in the Connecticut Motor Transportation Company has been acquired by William H. Vanderbilt, purchase being made through the Automotive Transportation Company, Inc., which was organized in 1925 by Mr. Vanderbilt and associates. The new acquisition controls the Gary Transportation Company, operating in the northeastern section of Connecticut; the Conlin Bus Lines, Inc., plying between Springfield and Worcester, and the Newport-Providence Street Railway.

Mr. Vanderbilt, who is president of the Automotive Transportation Company, Inc., and chairman of the board of directors of the corporation, said that no immediate radical changes were contemplated. He has been interested in motor transportation since 1925, when he invested in the Newport & Providence Street Railway. This company operated railway cars from Newport to Bristol Ferry, but with the adoption of buses the service was continued to Providence. During the past few years Mr. Vanderbilt has been buying into Massachusetts and Connecticut bus companies.

Would Run Buses.—The Illinois Power & Light Company has applied to the Illinois Commerce Commission for permission to discontinue railway service in Hillsboro, Ill., running from the Big Four depot to the Court House and from Hillsboro to Taylor Springs, and substitute buses for the cars.

Bus Lines Bought.—The Worcester Consolidated Street Railway, Worcester, Mass., has purchased the Lake Bus Lines, Inc., from Henry R. Carter. The deal includes seven buses. The Worcester company plans to continue the line, which operates between Salem Square and the north and south ends of Lake Quinsigamond.

Increases Coach Service.—The Wisconsin Power & Light Company has added two more coaches to its fleet of buses supplying city service in Sheboygan. The coaches are of 22-passenger capacity and will be used during the light traffic hours in place of the heavier 29-passenger buses. During peak loads both types of buses will be used. The company now has nine coaches in city service.

Bus Permit Granted in Oakland.—A certificate of public convenience and necessity has been granted by the California Railroad Commission to the Key System Transit Company to operate buses on Telegraph Avenue, in Oakland, between a terminus at Eleventh Street and Broadway and a terminus at Alcatraz Avenue and Dama Street and intermediate points as an extension and in connection with its present street railway system. The company intends to co-ordinate railway and bus service on Telegraph Avenue, using 29-passenger buses of safety type, charging a 7-cent fare with transfers.

Substitution Not Approved.—The proposed amendment of a Peoria, Ill., ordinance to permit the Peoria Railway to substitute buses on its Sixth and Second Avenues car lines has been referred to a committee of the Council for further investigation. It was announced, authough not a part of the official proceedings, that the railway proposed to have a bus line in operation by March 1 across the bluff district and down Western Avenue. This line was suggested recently by members of the Council.

Seeks Reconsideration.—The Interstate Buses Corporation, Hartford, Conn., has asked the Supreme Court of the United States to reconsider its recent decision which upheld the state of Massachusetts. The Interstate Buses Corporation sought to have an injunction lifted which prevented the operation of a bus line between Springfield and Greenfield, Mass., without first obtaining licenses from the towns through which the line passed. The injunction was imposed on a complaint by the Holyoke Street Railway. The corporation asserted that the case had been decided by the Supreme Court on the ground that the regulations complained of did not prejudice Interstate carriage of passengers, a question not considered in the lower court.

Financial and Corporate

Boston "L" Does Well

Earnings Satisfactory Under Very Trying Conditions—Increase in Number of Passengers Carried

During 1926 the cost of service on the Boston Elevated Railway, Boston, Mass., was $482,749 in excess of receipts. This is disclosed in the annual report which the board of public trustees has submitted to the Massachusetts Legislature. In 1925 the company earned $502,194 in excess of cost.

Total receipts in 1926 were $35,481,313 as against $34,547,380 in 1925, but wages had gone up from $16,931,550 in 1925 to $17,697,378 in 1926; total operating expenses went up from $24,405,736 to $26,076,268 and taxes went up from $1,652,518 to $1,910,765.

The number of revenue passengers increased to 371,218,401 from 365,036,286 in 1925.

Motor bus mileage of the Boston Elevated in 1926 compares with four previous years as follows: 1926, 4,717,900; 1925, 2,472,456; 1924, 890,901; 1923, 465,382; 1922, 63,937.

On Dec. 31, 1926, the road was operating 150 owned buses, as compared with 69 on Dec. 31, 1925. In addition, on Dec. 31, 1926, the road was operating 80 leased buses, against 80 in 1925.

In discussing phases of operation the trustees say in their report that while there has been a reduction in some types of accidents, vehicle collisions have increased and there has been an increase in total expense for injuries and damages of $261,000 over the preceding year.

The annual charge for depreciation is $346,000 more than for the previous year due to increases in investment in depreciable property. By far the greater portion of this increase arises from the expansion of bus service and consequent increase in number of buses owned. The life of a bus is relatively short as compared with nearly all other elements of the properties and consequently necessitates the annual accrual of a high percentage of the cost in order to provide for replacement at the proper time.

Added revenue arising from greater number of passengers carried and from larger payments from advertising and station privilege contracts has offset some of these increased costs but the net result is as stated above. Effort has been made during the year adequately to meet proper maintenance charges, which had been curtailed somewhat during the previous year. The trustees say:

> For some time test installations of automatic passimeters similar to those commonly in use in New York subways have been made with apparent success. Sixty of these have been ordered and when placed in use will result in operating economy.
>
> In conjunction with the transit department of the city of Boston a very considerable amount of work has been performed on the Dorchester Tunnel Extension. It is anticipated that the portion to Fields Corner will be placed in operation during the current year. Sixty additional cars of the type now in use in the Cambridge-Dorchester Tunnel service have been ordered and will be received by the time this portion of the extension is ready for operation.
>
> The Somerville garage was placed in operation on Dec. 6, 1926, with a present capacity of 112 buses. This made possible the surrender of some leased garage space and avoided the necessity of leasing additional quarters.
>
> Replacement of the last wooden elevated cars, 100 in number, has been undertaken by an order for a similar number of modern steel cars. Eighty-one buses have been added during the year to cover the line on which bus operation has been started.
>
> Snow-fighting equipment to meet the exigencies of snowstorms under present-day traffic conditions has been added at a cost of $28,000, so that at the present time there is more than $600,000 invested in snow-fighting equipment.

TRAFFIC STATISTICS OF THE BOSTON ELEVATED RAILWAY

	1926	1925	1824
Round trips operated	7,526,260	7,185,587	6,994,749
Passenger revenues	$34,393,954	$33,790,442	$33,419,172
Passenger revenue per car-mile	59.41c	60.93c	59.69c
Passenger revenue per car-hour	$5.75	$5.86	$5.67
Passenger revenue miles	†57,895,881	†55,461,094	†55,988,679
Passenger revenue car-hours	5,980,267	5,767,957	5,894,115
Revenue passengers carried	371,218,401	365,036,286	382,888,848
Revenue passengers carried per car-mile	6.412	6.582	6.838
Revenue passengers carried per car-hour	62.07	63.28	64.96

†Including motor bus mileage.

System of Accounting for Depreciation

Interstate Commerce Commission Announces Hearing to Be Held on Plan to Be Prescribed for Electric Railways Submitted for Its Consideration

The Interstate Commerce Commission announced on Jan. 27 that the depreciation section of its bureau of accounts proposes to enter an order prescribing a system of depreciation accounting for electric railways substantially the same as that entered recently with respect to depreciation charges of steam railroad companies. Before considering the proposed order, the commission will hold a hearing on Feb. 28, at Washington, D. C., before Examiner Bunten, at which those concerned will be given opportunity to testify. The text of the notice follows:

> By paragraph 5 of Section 20 of the interstate commerce act, as amended by the transportation act, 1920, the Interstate Commerce Commission is directed, as soon as practicable, to "prescribe for carriers subject to this act, the classes of property for which depreciation charges may properly be included under operating expenses, and the percentages of depreciation which shall be charged with respect to each of such classes of property, classifying the carriers as it may deem proper for this purpose."
>
> In carrying out this provision of the act the commission upon its own motion instituted a general investigation of depreciation charges of all classes of common carriers subject thereto and has held hearings and heard argument concerning depreciation charges of steam railroads and of telephone companies. Following this the commission's report, Telephone and Railroad Depreciation Charges, 118 I.C.C. 295, in which a general discussion of the subject appears, together with appropriate orders in the matter, was made public.
>
> As the fundamental principles which are controlling in the application of depreciation accounting for the property of steam railroad companies and telephone companies appear to be controlling also with respect to the application of depreciation accounting for other classes of common carriers, the depreciation section of the bureau of accounts which conducted the various preliminary investigations now proposes:
>
> 1. That the commission enter an order concerning depreciation charges of electric railways substantially the same as that entered with respect to depreciation charges of steam railroad companies.
>
> 2. That the classes of property of electric railways for which depreciation charges may properly be included under operating expenses are the classes of property includible in the following accounts:

WAY AND STRUCTURES

No.	Name
505,	Ballast.
506,	Ties.
507,	Rails, rail fastenings and joints.
508,	Special work.
509,	Underground construction.
511,	Paving.
512,	Roadway machinery and tools.
513,	Tunnels and subways.
514,	Elevated structures and foundations.
515,	Bridges, trestles and culverts.
516,	Crossings, fences and signs.
517,	Signals and interlocking apparatus.
518,	Telephone and telegraph lines.
519,	Poles and fixtures.
520,	Underground conduits.
521,	Distribution system.
522,	General office buildings.
523,	Shops and carhouses.
524,	Stations, miscellaneous buildings, and structures.
525,	Wharves and docks.
526,	Park and resort property.

EQUIPMENT

No.	Name
530,	Passenger and combination cars.
531,	Freight, express and mail cars.
532,	Service equipment.
533,	Electric equipment of cars.
534,	Locomotives.
535,	Floating equipment.
536,	Shop equipment.
537,	Furniture.
538,	Miscellaneous equipment.

POWER

No.	Name
539,	Power plant buildings.
540,	Substation buildings.
541,	Dams, canals, and pipe lines.
542,	Power plant equipment.
543,	Substantial equipment.
544,	Transmission system.

FINDING IS REVISED

> 3. That in the place of finding (8) in No. 15100 regarding the assignment of specific amounts to the primary accounts under road and equipment the following findings shall be made:
>
> That each electric railway which has not yet assigned appropriate amounts to the primary road and equipment accounts covering property for which depreciation accounting is herein prescribed shall do so not later than Jan. 1, 1928; that such companies as have already made an assignment of investment to the primary accounts, shall redistribute the same; that such distribution or redistribution shall be made as indicated below; and that the remainder of the amount in the books representing the carrier's investment in road and equipment shall be carried in sub-accounts which will be provided for later in the commission's classifications, for inclusion of the carrier's unassigned investment in road and equipment;
>
> (a) Where the property has been constructed by or for the accounting company, the amount to be assigned to the primary accounts covering depreciable property

shall be based upon the actual cost of construction if such information is available, and if the actual cost is not available the amount to be assigned to the primary accounts covering depreciable property shall be upon basis of the estimated cost of construction as of the date the property became available for operation.

(b) Where the investment account of the carrier includes the cost of property not constructed by or for the accounting company which was purchased at a cost in excess of its depreciated structural value as of the date purchased, such structural value, less an allowance for that portion of the purchase price includible in accounts not classed as covering depreciable property, shall be apportioned to the primary accounts covering the depreciable property.

(c) Where the investment account of a carrier includes the cost of property not constructed by or for the accounting company which was purchased at a price equal to or below its depreciated structural value as of the date purchased, the apportionment of the cost to the accounting company to the primary accounts covering the depreciable property shall be upon a basis which will permit the assignment to other primary road and equipment accounts of an appropriate proportion of the same.

$1,900,000 Equipment Trust for Philadelphia Rapid Transit

A new issue of $1,900,000 of 5 per cent equipment trust certificates, series K, of the Philadelphia Rapid Transit Company, Philadelphia, Pa., is being offered by Dillon, Read & Company, New York. The proceeds will be used in part payment for new gas-electric motor bus equipment. The certificates are issued under the Philadelphia plan and will mature from Dec. 1, 1927, to 1936. They are priced to yield from 4.75 to 5.30 per cent.

Reference to the 218 buses to be covered by the equipment trust is made elsewhere in this issue.

Passenger, Fare and Wage Figures Compared

The electric railways close the year 1926 with a substantial increase in their traffic for the month of December, and the result for the whole twelve months of 1926 was an increase over the year 1925.

The number of revenue passengers, including bus passengers, reported to the American Electric Railway Association by 213 companies for December, 1926, compared with December, 1925, is as follows:

December, 1926	867,763,895
December, 1925	852,109,119
Increase, per cent	1.84

For the calendar year 1926, a group of 217 companies, with only a few companies missing for the last few months of the year, reported the following number of revenue passengers, including bus passengers, carried:

Calendar year 1926	9,655,400,529
Calendar year 1925	9,534,870,690

The average cash fare in cities of 25,000 population and over follows:

	Cents
Jan. 1, 1927	7.7570
Dec. 1, 1926	7.7423
Jan. 1, 1926	7.6213

Average maximum hourly rates paid motormen and conductors in two-man service by companies operating 100 or more miles of single track follow:

	Average Hourly Rate, Cents	Index Number 1913=100%
Jan. 1, 1927	56.88	208.73
Dec. 1, 1926	56.88	208.73
Jan. 1, 1926	56.31	206.64

Toronto Deal Completed

Transportation Commission, Now Operating City Lines, Takes Over Control of Radials

Dawn of a new day at the beginning of a new year seems to have been the time appropriately designed for the transmittal of authority over Toronto's radials from one commission to another. At midnight on Jan. 12 in the North Toronto radial station on Yonge Street, the city's boundary line, Mayor Foster acted as intermediary in passing over the official agreement of operation from the hands of W. R. Robertson, general superintendent of the Ontario Hydro Radials, to the hands of P. W. Ellis, chairman of the Toronto Transportation Commission. But the ceremony of a few minutes was the amen to the battle between the "powers that be" of the two commissions and the city, which has raged for more than a year and a half. The agreement was approved unanimously by all members of the City Council present on Dec. 17—with the exception of the Mayor, who refrained from voting, and Alderman Wright, who was absent from the meeting. It should, perhaps, here be explained that the radials have a financial structure entirely independent of the city system.

Seldom has a city staged so dramatic a performance of its civic affairs as did Toronto on this occasion. But the new addition of railways has brought the system out of its local territorial interest to that of a broader scope in that it now constitutes the second largest electric railway system in North America under public ownership, Detroit having first place. Festivities lasted from 7 o'clock one evening until nearly 3 o'clock the next morning. The Mayor acted as leading dramatist in the rôle of conductor of the first car, gayly draped in flags with huge letters T.T.C. emblazoned on its sides, which was run from the city under the new management.

MILEAGE NOW UNDER TORONTO TRANSPORTATION COMMISSION

	Single-Track Miles
City street railways	227
Buses (included in city fare)	18
Coach route in city	8
Township and Weston lines	16
York radials	97
	366

For many years, according to the Toronto press—which also played its part in most effective co-operation—it was the dream of the late Sir Adam Beck, the founder of Hydro, to see high-speed radials meet in the heart of the city under unified control. But it was a vision of a very huge transaction, involving more than $3,000,000, with $1,088.000 actually being paid in cash and $2.375,000 assumed by the city in bonds which represent the McKenzie interests of 90 miles of road. Operation cannot be begun in the downtown section, however, until winter is over, because the gage of the metropolitan and Mimico divisions will have to be changed. Meantime, a temporary connection will be made between the West Hill line and the city system.

In all 366 miles of lines have been acquired by the city for municipal operation.

According to D. W. Harvey, general manager of the Transportation Commission, this does not mean that other municipalities will not be taken into partnership agreements. When asked the question by a newspaper reporter, he answered in the affirmative.

Quotations from the agreement provide that:

Clause I.— . . . "all the powers, rights, authorities and privileges of the city as to control, management and or operation of the railways and future extensions or additions to such railways, or any transportation service to be operated in connection with such railways shall be exercised by the commission and not by the Council of the city.

Clause IIIa.—The city will from time to time furnish to the commission on demand such moneys as it may require to carry out its powers and duties hereinunder including such sum in excess of operating revenues as may be required to meet the full cost of maintenance and operation, which cost shall include such maintenance, renewals, depreciation and debt charges as the commission shall think proper; notwithstanding anything in the foregoing, any moneys requested by the commission for new capital expenditure shall only be furnished it when approved by the Council of the city.

Clause IV deals with the powers and duties, namely, that the commission will have power to extend the railways by lines of railways; motor bus routes or any other means of transportation, and to control, maintain, operate and manage such additions. That it will fix fares and tolls so that as far as possible transport will be self-sustaining after providing for maintenance, renewals, depreciation, etc.

Clause VI provides that the commission will keep separate books of accounts of receipts and expenditures of the new divisions provided in the agreement and Clause VII that all moneys will be kept separate for this purpose also. Other provisions follow:

Clause IX.—Immediately after the close of each calendar year the commission shall submit to the Council of the city a completely audited balance sheet and certified financial statement of the affairs entrusted to it by this agreement, including a revenue and expense account, and profit and loss statement of each division of the railways and said statement shall be accompanied by a general report of the operations of the commission under this agreement during the year.

Clause XII.—The commission will, if it deems advisable after providing for maintenance, repair and operation and such maintenance renewals, depreciation and debt charges as it shall think proper pay to the city any surplus of revenue over expenditures remaining in its hands at the end of any year in respect of the railways and transportation services entrusted to its management by this agreement.

Groton & Stonington Reorganizes

New directors of the Groton & Stonington Traction Company, Mystic, Conn., are Clarence E. Thompson, Jr., New Haven, and Lucius E. Whiton, New London. The new financial structure contemplates an issue of $250,000 first mortgage income bonds. Each holder of a $1,000 of first mortgage bond of the Groton & Stonington Street Railway will receive a new $500 bond of the Groton & Stonington Traction Company, together with ten shares of stock, par value $100. The Winthrop Trust Company, New London, is trustee under the indenture securing the first mortgage bonds.

Change in Fairmount Park Capital Structure

At the annual meeting of the Fairmount Park Transit Company, Philadelphia, Pa., to be held on Feb. 21, stockholders will vote upon a change of capital stock of the company to provide for the authorization of 150,000 shares of common stock without par value in lieu of the present authorized common stock of 40,000 shares, par $10, and to provide for the authorization of the issuance of three shares of common without par value about to be authorized by the State of Delaware in exchange for each share of the common stock now issued and outstanding.

Combined operating account of the Fairmount Park Transit Company and the Woodside Real Estate Company for the year ended Dec. 31 shows revenue from all sources of $565,700, compared with $449,661 in 1925. After operating expenses, interest, depreciation, but before deduction for federal taxes, there was a combined profit of $114,286, compared with $57,215 in 1925.

Auction Sale of Washington-Virginia Line

The Washington-Virginia Railway, Washington, D. C., is to be sold at auction some time in April next. An announcement to this effect was made recently by Attorney Gardner L. Boothe, division counsel of the company. The Circuit Court has named John S. Barbour, Judge J. K. M. Norton and Gardner L. Boothe with Edward Hopkinson of Philadelphia as commissioners of sale.

The road, which consists of 40 miles of track connecting Alexandria, Va., Washington, Mount Vernon and Fairfax, was placed in the hands of a receiver on Nov. 23, 1923. At one time the road was virtually the only means of transportation to Mount Vernon and to Alexandria, but bus lines have hurt it recently.

It is said that the total bonded indebtedness of the road is $3,500,000, of which amount $2,500,000 is on the Mount Vernon division and $1,000,000 is on the Falls Church division. No interest has been paid on the bonds for several years.

6,000 Shares Sold to Residents of Dallas

The initial offering of Dallas Railway & Terminal Company, Dallas, Tex., 7 per cent cumulative preferred stock placed on sale on Nov. 4, 1926, has met strong public demand and more than 6,000 shares have been sold.

As J. W. Carpenter, president of the company, sees it, the excellent financial condition of Dallas people is reflected in the sale of the stock. At the time the stock was placed on sale there was much talk about the depressing effect of low cotton prices on general business conditions in Dallas. The sale of the stock is limited exclusively to Dallas residents. The fact that more than 96 per cent of all sales have been for cash shows there is money available for sound investments. Since the purpose of selling the stock to the public is frankly to obtain more active and widespread interest in the company by its patrons, the officers of the company are especially pleased with the wide distribution of stock in small lots to investors who take a personal interest in the company.

Mr. Carpenter said:

> The loyalty of our employees is shown by the fact that more than 98 per cent have bought stock for themselves and a large number have been active in selling to the public. Keen competition by employees in the sale of this stock has made it necessary for them to become better acquainted with company policies and the educational effect of the campaign is reflected in the improved personal service that has come from it. Since our employees are now financially interested in the company and realize that many of their patrons are company stockholders, there is increased incentive to render high-class service.

Receivership of Oklahoma Railway May End Soon

The receivership of the Oklahoma Railway, Oklahoma City, Okla., may be ended at the close of 1927 provided there is no slump in business conditions, according to Gabriel T. Lackey, joint receiver with George A. Henshaw and president of the company. The company had approximate net earnings of $60,000 during 1926, which was its most successful year of two years of receivership. The company made many improvements in 1926. Perhaps the outstanding achievement was establishment of a system of 26 buses which are self-supporting.

New Director Elected.—W. G. Murrin, vice-president of the British Columbia Electric Railway, Vancouver, B. C., Canada, was elected a director of the company at the annual meeting of shareholders in London, England, on Dec. 15.

Pittsburgh Pays Its Notes.—It was announced recently that the $500,000 of 6 per cent notes of the Pittsburgh Railways, Pittsburgh, Pa., due on Feb. 1, 1927, would be paid off at maturity at the office of the Union Trust Company, Pittsburgh.

New Bill Would Double Tax Rate.—A bill has been introduced before the Wisconsin Legislature providing for the taxation of light and power companies operating electric railways according to the local rate of the community in which they operate, to replace the general tax rate method now in force. If the bill is enacted the general tax rate of 2.01 now levied against these companies would be practically doubled.

Ordered to File Objections.—Carl F. Morrow, judge of the Circuit Court at Anderson, Ind., has ordered creditors of the Union Traction Company of Indiana, now in receivership, to file their objections, if any, by April 2, to a report filed July 30, 1926, by Arthur W. Brady, receiver of the Union Traction Company.

Will Vote on New Financial Plan.—In accordance with recommendations made by the board of directors of the Wisconsin Public Service Corporation, Green Bay, Wis., stockholders were to vote on Feb. 3 on a new financing program which provides for increasing the amount of preferred stock from $5,500,000, par value, to $12,500,000, increasing the authorized common from $3,000,000 to $7,500,000 and dividing up the present $100, par value, common shares into $10 par value common stock. In explaining this change in the financial structure, Clement C. Smith, chairman of the board, asserted that business has been growing very rapidly and additional capital was needed for development.

New Directors Elected. — Henry Scandrett, vice-president of the Union Pacific Railroad, and Emmet Tinley were recently elected directors of the Omaha & Council Bluffs Street Railway, Omaha, Neb. Their affiliation with the board of directors of that company increases the number to eleven members.

Exchange of Securities at Evansville.—The Evansville & Ohio Valley Railway, operating from Evansville, Ind., to Mount Vernon, Ind.; Grandview, Ind., and Henderson, Ky., has been granted permission by the Indiana Public Service Commission to issue $235,100 in first and refunding 7 per cent bonds in exchange for $235,000 of 7 per cent preferred stock of the Evansville, Henderson & Owensboro Railway.

Residents Favor City Purchase.—Residents of the Rainier Valley, an urban district of Seattle, Wash., are working to mold public opinion prior to the March elections to the end that the lines of the Seattle & Rainier Valley Railway be purchased by the city for $1,200,000 and made a part of the municipal railway system. The City Council has approved the purchase. The matter is now up to the voters at the March election. It is pointed out that the city can save $160,000 a year in transportation costs by operating over the tracks on Fourth Avenue now owned by the Rainier Valley system and used exclusively by it, at which rate, it is estimated, the lines would be paid for in 7½ years.

New Mexico Loses Railway.—The Las Vegas Transit Company, Las Vegas, N. M., has been authorized by the City Council to abandon railway service. The company has had a losing struggle with automobile competition and fares are not enough to offset this loss. The line was 3 miles long. It was operated between Las Vegas and East Las Vegas.

Harp on Colorado Abandonment.—Attorneys, citizens and various business bodies of the cities of Louisville and Boulder, Col., are after the Colorado Public Utilities Commission to force Receiver William H. Edmunds of the Denver & Interurban Railroad to restore the operation of trains on the road, regardless of the fact that the federal District Court at Denver instructed the receiver to discontinue operation because the road was unable to pay its debts; that it should sell the properties and turn the money over to its creditors. Some lawyers claim that should the commission take any such action, it would be in contempt of the federal court. No electric trains are being operated despite the speculation. The trains were discontinued on Dec. 15.

Legal Notes

FEDERAL CIRCUIT COURT OF APPEALS.—*Division of Cost of Maintaining Railroad Gates at Crossing.*

A steam railroad and an electric railway made a contract for the maintenance of a crossing by which the larger part of the cost of maintaining the crossing was placed upon the electric railway company. Later, the latter sued the railroad company to recover up to half the cost of maintenance of the crossing on the ground that the contract was void for want of consideration. It was held, however, that the obligation of the steam road to maintain gates at the crossing was sufficient consideration to support the contract. [Erie Railroad vs. Cleveland Railway, 15 Federal Rep. (second), 374.]

FEDERAL CIRCUIT COURT OF APPEALS—*Judgment for Seller of Street Railway Against City Which Acquired Railway Through Action of Council Held Not Chargeable Against General Funds of City.*

Laws of the state of Washington prescribe two methods by which a municipality may acquire a street railway or other utility. The first method is where a general indebtedness is to be incurred. With this method, the plan and cost thereof must be approved by the voters. The second method is where the charter of the city, adopted by vote of the people, authorizes the authorities to acquire the property, but its cost and expense of operation is to be paid exclusively from its own revenues. In this case the city council may act alone. In an agreement to purchase a railway, made according to the second method, the city agreed to pay a certain proportion of the taxes on the property for the year of purchase as part of the consideration, but the Circuit Court of Appeals for the Ninth Circuit held that this amount was not collectible from the general funds of the city. [City of Seattle vs. Puget Sound P. & L. Co., 15 Federal Rep. (second), 794.]

FEDERAL SUPREME COURT — *Statute Specifying Price of Gas Held Invalid.*

In an act approved June 2, 1923, the New York State Legislature directed that thereafter in New York City not more than $1 per 1,000 feet should be demanded for gas of 650 B.t.u. The statute was declared invalid because confiscatory. [Ottinger vs. Consolidated Gas Co., New York, 47 Supreme Court Rep., 198. Also two similar cases on page 199.]

FEDERAL SUPREME COURT—*Valuation of Utility Based on Present Prices and Price Trends. Seven Per Cent Return Sustained.*

"In determining present value, consideration must be given to prices and wages prevailing at the time of the investigation; and, in the light of all circumstances, there must be an honest and intelligent forecast as to probable price and wage levels during a reasonable period in the immediate future. . . . The testimony of competent valuation engineers who examined the property and made estimates in respect of its condition is to be preferred to mere calculations based on averages and assumed probabilities. . . . The evidence is more than sufficient to sustain the rate of 7 per cent found by the commission, and recent decisions support a higher rate of return." [This decision was reviewed editorially on page 1034 of the issue of this paper for Dec. 11, 1926.] [McCardle vs. Indianapolis Water Co., 47 Supreme Court Rep., 144.]

ILLINOIS—*Duty to Repave Held to Include Reconstruction after Water Mains Are Laid.*

According to the 1907 ordinance, the Chicago City Railway Company was obliged, at its own expense, to fill, grade, pave and repair that portion of the street occupied by it as specifically provided in an accompanying exhibit. This duty was held to include that of repairing its portion of the street when such repair became necessary for any reason, as when the city had removed the paving for the introduction of water and sewer pipes. The railway company's track foundations, for this purpose, were held to be a part of the "street," so that track foundations removed by the city in its work of laying the water and sewer pipes had to be renewed at the expense of the company. [Chicago City Ry. vs. City of Chicago, 154 Northeast. Rep., 112.]

MASSACHUSETTS—*Motorman Not Negligent When Car Hits Person Stooping on Track.*

A person occupying a house adjoining an electric railway exposed track attempted to drain some water from his basement with a hose, and while on the track stooping over to adjust this hose was struck by a car. He was not in a place where a motorman might reasonably anticipate someone would be on the track, and as he was in a stooping position, he could not readily be seen by the motorman, although it was not dark. The company was held not responsible. [Chatterton vs. E. M. Street Railway, 154 Northeast. Rep., 259.]

MISSOURI — *Duty Under "Vigilant Watch" Ordinance.*

Under the St. Louis Vigilant Watch Ordinance, it is the motorman's duty to be on the lookout for persons or vehicles on or approaching the track and to stop his car in the shortest space and time possible. This duty is continuous and failure of the motorman to see an approaching automobile in time to avoid collision with it from a point where he could have seen it in the exercise of the care prescribed by the ordinance constituted negligence. [Riggle vs. Wells, 287 Southwest. Rep., 803.]

NEW YORK—*Injury to Finger in Sliding Door.*

A passenger to preserve his equilibrium in boarding a subway car placed his hand on the edge of a sliding door operated pneumatically in multiple with other doors. The door moved forward, then slid back into its casing, bruising and contusing one of the fingers of the plaintiff. Judgment for the defendant was affirmed on the ground that the accident was not caused by any negligent act of the defendant's servants. [Siegel vs. Interborough R.T. Co., 214 N. Y. Supp., 71.]

NORTH CAROLINA. — *Reckless Driving Even If Not Followed by Collision Constitutes Negligence.*

Where a person was struck by a bus which turned off the road to avoid being struck by a bus with a different owner, the relative liability of the owners of each bus was held for the jury. [Shipp vs. United Stage Lines, 135 Southeast. Rep., 339.]

OHIO.—*Responsibility to Provide Safe Alighting Place for Passengers.*

A passenger, alighting from one car to transfer to another, tripped over a rail which was from two to four inches above the general level of the ground. While the passenger might have seen the rail if he had looked for it, his failure to do so was not held to be negligence. The stressing by the plaintiff's counsel of the fact that subsequent to the accident, there had been a substantial reconstruction by the company which reduced the height of the projecting rails—a fact not brought in issue by the defendant's evidence—was held reversible error. [Cleveland Railway vs. Halterman, 153 Northeast. Rep., 922.]

OREGON.—*Automobile Driver Making Left-Hand Turn in Front of Approaching Car Held Negligent.*

An automobile driver who, while closely following a street car, attempted to make a left-hand turn at a street intersection and was struck by a street car coming from the opposite direction, was held to be contributorily negligent as a matter of law for recklessly attempting to pass in front of a fast moving car. [Grasle vs. Portland R. L. & P. Co., 250 Pacific Rep., 379.]

TEXAS — *Railway Responsible for Prompt Removal of Injured Person to Hospital.*

A woman passenger fell while on a car and then was taken by the employees on a long trip to the company's office, then transported to a hospital, and then to her home. The entire trip lasted between two and two-and-a-half hours. Even though the company's negligence did not cause the original fall, it was liable for damages resulting from her detention on the car. [San Antonio P. S. Co. vs. Wellman et al., 288 Southwest. Rep., 582.]

WASHINGTON. — *Injury to Pedestrians at Street Intersection.*

Pedestrians at a street intersection who looked but failed to see the approaching car which struck them were held not contributorily negligent as a matter of law, as the approaching trolley car was obscured by intervening vehicles. [McLeod vs. the City of Seattle, 249 Pacific Rep., 1059.]

Personal Items

New Assistant Manager at Toronto

H. W. Tate Appointed Assistant Manager of Municipal Railway to Succeed A. T. Spencer

H. W. Tate has been appointed assistant manager of the Toronto Transportation Commission, Toronto, Ont., because of a vacancy created when A. T. Spencer, formerly assistant to the general manager, received an appointment as general superintendent of construction and maintenance in the way and structures department of the Montreal Tramways, Montreal, Que.

Mr. Tate was the first engineer to join the commission's staff, in 1920, and was engaged in the formation of the commission's rehabilitation and extension plans prior to the summer and fall of 1921, when the completed organization was formed and rehabilitation of the old lines of the Toronto Railway by the city commenced. He was appointed field engineer of the way department on Sept. 1, 1921, and was associated with the commission in this capacity during the rehabilitation of the unified transportation system in Toronto. Later, in May, 1924, Mr. Tate became engineer of way and was in charge of the way department until Jan. 25, 1927, when his appointment to the position of assistant manager was announced.

H. W. Tate

The new assistant manager is a graduate of the University of Toronto, having concluded a brilliant academic course when he led the graduating class of 1910 in civil engineering and received the degree of B.Sc. The wide range of his practical experience also has been a factor in qualifying Mr. Tate for his advancement. In 1905 and 1906 he was with the Canadian Pacific Railway on irrigation and maintenance of way. For three years, 1907-08-09, he was associated with mining engineering in the Cobalt camp. During the five years 1910 to 1914 he was engaged in land surveying and municipal engineering.

The World War interrupted Mr. Tate's career in civil life, but his enlistment in the Canadian Expeditionary Force with the Second Pioneer Battalion early in 1915 opened opportunities for wider engineering experience. During his four years of active service, three of which were spent in France, he attained the rank of major and was second in command of the Ninth Battalion Canadian Engineers. For three months, during which occurred the Canal du Nord attack of October, 1918, Major Tate, in the absence of his colonel, was in command o fthe battalion. He was twice mentioned in despatches by Sir Douglas Haig for gallant and distinguished conduct in the field.

Returning from overseas in 1920, Major Tate joined the staff of the Toronto Transportation Commission. He is an Ontario land surveyor, a Dominion land surveyor, an associate member of the Engineering Institute of Canada and a member of the Professional Engineers of Ontario.

W. H. McAloney Honored at Equipment Meeting

W. H. McAloney, superintendent of equipment of the Georgia Railway & Power Company, Atlanta, Ga., was elected president of the Southern section of the Electric Railway Association of Equipment Men at the closing session of a three-day convention held recently in Memphis. In his post as president he succeeds A. D. McWhorter, superintendent of the Memphis Street Railway, who has been president for five years, and who declined a sixth nomination.

Mr. McAloney is considered one of the leading equipment men. He took full charge of shops, carhouses and garage and assumed jurisdiction over the maintenance of all street cars and automobile equipment of the Georgia Railway & Power Company, Atlanta, Ga., about six years ago, when he filled the vacancy caused by the death of Mr. Moore. Sixteen years of his railway experience had been spent as superintendent of rolling stock of the Denver Tramways. While in Denver he was actively connected with the welfare association of the Denver Tramways. The latter city claims him as its own more than Atlanta because Mr. McAloney began work there for the Denver Tramways as a conductor in 1891, and after a few months of this work entered the office of E. W. Olds, at that time master mechanic. Later he was appointed division superintendent of the east division and still later to the shops as storekeeper. In 1902 he became superintendent of rolling stock, which position he held at the time of his resignation in 1918. It was in that year that Mr. McAloney was appointed superintendent of rolling stock of the Winnepeg Electric Railway. He remained in Winnipeg for two years, when he became associated with John A. Beeler, consulting engineer.

Articles by Mr. McAloney have appeared in the JOURNAL from time to time, dealing particularly with his experience and suggestions regarding various phases of railway equipment.

New Superintendent of Equipment at New Brighton

Henry J. Meyer, for the past 26 years master mechanic of the Beaver Valley Traction Company, New Brighton, Pa., has been promoted to superintendent of equipment for the Beaver Valley Traction Company, the Pittsburgh-Beaver Street Railway and the Beaver Valley Motor Coach Company, all with headquarters at New Brighton, Pa. Mr. Meyer is a member of the 25-Year Service Club, recently organized on the property, and in his years of experience has seen the advancement of the industry from the early days of electric cars to the present modern de luxe cars.

The new incumbent first provided money for his existence by working in a cigar factory at the age of 12. When asked why he selected transportation as his work, Mr. Meyer replied "because it is a good field of endeavor." In the general manager's bulletin issued as a weekly feature some complimentary remarks were made of Mr. Meyer's career. Service to the public and welfare of his company had been his constant thought.

H. J. Meyer

South Shore Line Appoints New Freight Representatives

Important changes in the personnel of the freight traffic department of the Chicago, South Shore & South Bend Railroad, Michigan City, Ind., were announced recently by F. W. Shappert, assistant to vice-president Bernard J. Fallon. A. W. Oberfell, formerly a commercial agent of the South Shore Line, was made general freight agent, and C. L. Binger, also a former commercial agent, was made assistant general freight agent. Mr. Oberfell's office will remain in South Bend, Ind., and Mr. Binger's headquarters will be in Chicago.

Mr. Oberfell has been associated with the traffic department of the South

Shore Line for more than a year, having previously been traveling freight agent of the Canadian Pacific with headquarters at Minneapolis.

Mr. Binger has served the South Shore Line since it came under its present management, having been associated previously with the Chicago, North Shore & Milwaukee Railroad.

Four "off-line" agencies were established in Minneapolis, Pittsburgh, Detroit and Kansas City, Mo. They are the first of their kind to be established by the South Shore Line and are a result of the rapid strides in the freight business of the road.

Personnel Changes on the Interstate Property

Changes in the personnel of the Interstate Public Service Company, Indianapolis, Ind., to become effective at the annual meeting of the company to be held on March 7, are as follows: President, Ernest Van Arsdel; vice-president in charge of gas, electric and water operation, I. L. Oppenheimer; vice-president in charge of railway operation, L. M. Brown; vice-president and treasurer, in charge of the financial department, W. Marshall Dale; vice-president and auditor, in charge of accounting and stores, A. D. Jones.

G. J. Oglebay, now district manager of the Bedford district, will go to the Indianapolis organization as assistant to the vice-president in charge of the gas, electric and water operation.

J. E. Albert in Charleston

J. E. Albert, recently affiliated with the Public Service Railway, Newark, N. J., is now serving in the capacity of assistant to Arthur M. Hill, vice-president and general manager of the Charleston Interurban Railroad, Charleston, W. Va., and president of the Midland Trail Transit Company and New River Transit Company. The latter two companies are purely intercity bus companies, while the Charleston Interurban Railroad operates several city bus lines. All of the companies are under the same management and control.

Early in 1926 Mr. Albert joined the ranks of the Public Service Railway as traffic engineer. For two years prior to that he had been assistant general manager of the Wheeling Traction Company, Wheeling, W. Va. Mr. Albert began his railway career with the West Penn Railways in 1916 while a student at the University of Pittsburgh. At that time he was engaged in valuation work. During the summer of the following year he again engaged in work for the West Penn.

Following his return to civil life after the war, he entered the special engineering department of the West Penn Railways, dealing with rates and valuation and the appraisal of electric and other properties prior to absorption by that company. He was also engaged on special reports covering arbitration of wages and similar subjects. He remained on this work until 1922. In that year Mr. Albert was transferred to the office of Vice-President C. P. Billings as assistant to that official. Two years later he was appointed to the position of assistant general manager at Wheeling.

As assistant to Mr. Hill, who has the entire responsibility of operating the railway and bus companies at Charleston, Mr. Albert is collaborating in working out important plans for that property.

W. A. MacRae Promoted in Toronto

W. A. MacRae has been appointed engineer of way of the Toronto Transportation Commission, Toronto, Ont., succeeding H. W. Tate, who has been promoted to the position of assistant manager. Mr. MacRae has been superintendent of construction in the way department since the summer of 1921, when the commission commenced its reconstruction and extension program, following the purchase of the property of the Toronto Railway. Prior to joining the Toronto Transportation Commission staff and since graduating from McGill University in civil engineering in 1913, he was engaged in general construction work.

New Commissioners Named in Pennsylvania

Emerson Collins and Samuel Walker have replaced Richard J. Beamish and Chris Golden as members of the Pennsylvania Public Service Commission following the rejection of the latter names on Feb. 1 and the submission of the two former by Governor Fisher. Both Mr. Beamish and Mr. Golden were appointees of Governor Pinchot. When the Senate finance committee met on Feb. 1 it decided to report negatively on the Pinchot men.

Emerson Collins, one of the new incumbents, is a resident of Lycoming County and was former deputy attorney-general. He taught school for a time, but left that work for the law, being admitted to the bar in 1887. He has since practiced in Williamsport.

Samuel Walker was admitted to the bar in Butler County in July, 1899. He is a graduate of the University of Pennsylvania law school. Mr. Walker resides in Butler, Pa.

The controversy provoked by the naming of Messrs. Beamish and Golden was the subject of comment in the JOURNAL at the time they were appointed.

Changes on Lake Shore Property

John Heim, Sandusky has been appointed superintendent of the city lines of the Lake Shore Electric Railway, Cleveland, Ohio, by Martin Ackerman, general manager. Mr. Heim succeeds Charles Coon, Lorain, who with P. M. Trueman, superintendent of the Toledo division, and Warren Gregg, superintendent of the Cleveland division, retired recently. Irving Robinson, Beach Park, was named to succeed Mr. Gregg and Sherman Gibson, Fremont, to succeed Mr. Trueman.

The three new incumbents have all been in the employ of the company many years. Mr. Heim's headquarters will be at Lorain, Mr. Robinson's at Cleveland, and Mr. Gibson's at Fremont.

Obituary

T. M. Jenkins

Thomas M. Jenkins, former railway official, died on Jan. 23 in St. Louis, Mo. Mr. Jenkins started his railway career as a driver of a horse-drawn car in Albany, N. Y., and worked himself up to the position of superintendent. For a while he was general superintendent of the Cincinnati, Newport & Covington Traction Company. He went to St. Louis, Mo., in 1900 as general manager for the St. Louis & Suburban Railway, then operated independently, but now part of the system of the United Railways, with which it was merged in 1906. Mr. Jenkins left the St. Louis & Suburban to enter the coal business as president of the St. Louis & O'Fallon Coal Company, St. Louis, owned by the Busch interests. In more recent years he headed the Regal Coal Company. Mr. Jenkins was born in Albany, N. Y., in 1862. As a youth he served as a page in the New York Legislature.

Col. H. G. Prout

Col. Henry G. Prout, internationally known engineer and editor, died on Jan. 26 at his home in Summit, N. J. His name was well known as a Civil War veteran, colonel in the Khedive's service in Egypt and as editor of *Railroad Gazette*, now the *Railway Age*. Colonel Prout succeeded General Gordon when that commander went down to Khartum as Governor-General of the Sudan. Mr. Gordon's opinion of him is shown by the fact that he had Colonel Prout promoted twice and at the end suggested him for the rank of Pasha and offered him the governorship of either of two provinces if he would stay in the service. When Colonel Prout returned to America in June, 1878, he entered the service of the Toucey & Buchanan Interlocking Switch Company, Harrisburg, Pa., which later became one of the constituents of the present Union Switch & Signal Company. After a year or so of this work, Colonel Prout entered the printing business with the firm of Atkins & Prout, which printed the *Railroad Gazette* for several years before Colonel Prout became editor of that paper in March, 1887.

During the next sixteen years, as editor of *Railroad Gazette*, Colonel Prout took an active part in railroad activities throughout the entire country. So great was the respect in which his judgment on engineering problems was held that an editorial written by him and read on the floor of the United States Senate influenced the selection of Panama instead of Nicaragua as the route of the Isthmian canal.

In 1903 Colonel Prout resigned as editor of *Railroad Gazette* and as a director of the corporation to become first vice-president and general manager of the Union Switch & Signal Company. In July, 1914, Colonel Prout, then president of the company, resigned, and in November of the same year became president of the Hall Switch & Signal Company, a position he held until his resignation and retirement the following year.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Rockford & Interurban Spends $100,000 for New Cars

Rockford & Interurban Railway, Rockford, Ill., has ordered ten interurban cars of the latest design from the American Car Company of St. Louis, at an estimated expenditure of $100,000. These cars will be operated out of Rockford on lines radiating to Beloit, Janesville, Freeport and Belvedere. They are designed for a speed of 60 m.p.h., and are expected to reduce the running time between these cities. The new rolling stock will be placed in operation in about six months, at which time will be instituted a door-to-door freight service through the medium of transferrable bodies, a service already successful on the North Shore line. Thirty of these bodies of 6-ton capacity are now being constructed in the company's shop.

$654,900 Budget in Minneapolis Includes 25 Cars

More than $600,000 will be spent by the Minneapolis Street Railway, Minneapolis, Minn., in 1927. The budget of the railway for 1927 having been approved on Jan. 28 by the City Council, materials will be bought and work will begin simultaneously on the various projects in the spring. Probably the most popular work is the new crosstown line on 50th Street from Xerxes Avenue to Bryant Avenue South, connecting the Oak-Xerxes and Bryant-Johnson lines, the first crosstown line south of Lake Street. This will necessitate double track from Xerxes to Penn Avenue South, terminus of the Oak-Harriet line, an extension of the Xerxes line, eight blocks, and a new double-track line from Penn to Bryant, fourteen blocks. A single track is to be laid on Penn from 50th to 54th Street.

Other projects include double tracks from 46th Avenue and 46th Street to and across the new Ford bridge over the Mississippi River, doubling the single track on 41st Street from 42d to 46th Avenue South, and on 46th Avenue from 41st to 46th Street, and on the Lyndale-Bryant Avenue North line from 42d Avenue to the city limits. Six other projects include new rails and paving between tracks and 25 new type noiseless cars. The total budget is $654,900.

Fifteen De Luxe Cars Ordered by Chicago, Aurora & Elgin Railroad

What is said to be a new type of de luxe passenger car will be introduced by the Chicago, Aurora & Elgin Railroad as a result of an order placed with the Cincinnati Car Company for fifteen motor-equipped passenger coaches to cost a total of $585,000 or $39,000 each. Delivery of these cars is expected about July 1.

The new rolling stock will be of all-steel construction, equipped with a combination straight and automatic air-brake system. Additional features will be triple-tier truck springs, 52 bucket-style seats upholstered in Byzantine plush, separate smoking compartment accommodating twelve persons, an elaborate toilet section, maroon exterior and mahogany interior finish. The cars, weighing 102,000 lb. each, are designed for high-speed operation and will carry four 150-hp. motors. Although the coaches will approximate in convenience and comfort the ordinary railroad parlor cars, there will be no extra fare charged.

According to a recent statement by Col. Edward J. Blair, general manager of the company, "these luxurious cars will give our customers transportation on rails which equals that of the appointments of the most luxurious private automobiles, in addition to the advantages which they now have of speed and highly skilled drivers.

"It is our desire," said Colonel Blair, "to give the western suburbs and Fox River Valley the best transportation to be found anywhere in the country, and this very large expenditure is in keeping with that. These cars will give the Chicago, Aurora & Elgin Railroad a considerable additional capacity to serve the public. We believe this distinct innovation in transportation will be pleasing to our customers, just as have been the other very large extensions and improvements which this high-speed, electrically operated railroad has made since the present management took charge more than ten months ago."

Party Lines Waived on Wooden Car Elimination

From latest reports Republican and Democratic legislators of New York City will make a determined effort during the present session of the Legislature to eliminate all wooden cars on subways and elevated lines in Greater New York. Senator Kleinfeld on Jan. 24 introduced a measure compelling the withdrawal of all wooden rolling stock within one year. Assemblyman Hofstadter announced that he was drafting a measure calling for the elimination of the cars, but had not decided to place a time limit on their withdrawal.

$2,720,000 Bus Order Placed by Philadelphia Rapid Transit

The Philadelphia Rapid Transit System has placed an order for 201 gas-electric buses with the Yellow Truck & Coach Company of Chicago at a total expenditure of $2,720,000. According to an announcement made public on Feb. 1, work has already been started on the new equipment, which will consist of 100 single-deck, 50 double-deck and 51 parlor car buses. The order also includes seventeen smaller gas-electric motor service units. With this new order delivered the Philadelphia company will have a total of 575 buses in operation. Delivery is expected in May and the buses, it is understood, will be used in developing new lines in and around Philadelphia.

In connection with the purchase of this new equipment the company has sold to Dillon, Read & Company a new issue of $1,900,000 equipment trust 5 per cent certificates which will be offered to the public shortly.

Electric Locomotive Shipments

December shipments of electric locomotives from principal manufacturing plants based on reports received by the Department of Commerce totaled 28 locomotives, as compared with 16 in November and 22 in December, 1925. Shipments for 1926 totaled 234 locomotives, as compared with 184 in 1925. The following table gives the shipments and unfilled orders of electric locomotives for each month since January, 1925:

ELECTRIC LOCOMOTIVES SHIPPED FROM PRINCIPAL MANUFACTURING PLANTS, 1925 AND 1926

	Shipments			Unfilled Orders End of Month		
Year and Month 1925	Domestic	Foreign	Total	Domestic	Foreign	Total
January	12	2	14	44	15	59
February	7	3	10	51	12	63
March	13	2	15	51	15	66
April	14	0	14	41	29	60
May	9	2	11	48	31	79
June	8	6	14	47	25	72
July	12	4	16	39	23	62
August	6	8	14	48	15	63
September	16	8	24	41	7	48
October	21	1	22	40	12	52
November	8	0	8	46	40	86
December	18	4	22	54	41	95
Total (year)	144	40	184	..	..	...

	Shipments			Unfilled Orders End of Month		
Year and Month 1926	Domestic	Foreign	Total	Domestic	Foreign	Total
January	11	0	11	53	42	95
February	22	2	24	60	40	100
March	11	1	12	50	41	91
April	12	16	28	44	29	73
May	14	9	23	46	23	69
June	11	3	14	53	20	73
July	20	0	20	36	23	59
August	16	7	23	26	16	42
September	13	7	20	24	11	35
October	15	..	15	20	13	33
November	15	1	16	27	15	42
December	17	11	28	14	8	22
Total (year)	177	57	234	..	..	...

Chicago Surface Lines Now Operating 100 Cars of This Type Built by Three Manufacturers

Brill Completes Delivery of 33 Surface Cars to Chicago

Information has just been received from the J. G. Brill Company of Philadelphia that it has delivered the 33 cars which were ordered by the Chicago Surface Lines last May. These cars were part of an order for 100 which was divided between the Cummings Car & Coach Company of Paris, Ill., the Brill Company and the St. Louis Car Company, St. Louis. They are practically the same design throughout as the 100 cars purchased in 1924, and described in the ELECTRIC RAILWAY JOURNAL, issue of Nov. 15, 1924, page 837, and in the issue of May 27, 1926, page 908. The new cars are designed for multiple-unit operation, giving them the maximum flexibility between service of single two-man or one-man operation. Although general specifications for the entire order were carried in the ELECTRIC RAILWAY JOURNAL of May 22, 1926, specifications of the Brill order are appended as they differ to some extent from the original set as recorded in that issue:

Number of cars ordered	33
Date order was placed	May 13, 1926
Date of delivery	October 20, 1926
Builder of car body	J. G. Brill Co.
Type of car	Closed, 32 ft. 9 in.
Seating capacity	51
Weights:	
Car body	21,640 lb.
Trucks	11,470 lb.
Equipment	8,590 lb.
Total	41,700 lb.
Bolster centers, length	22 ft. 0 in.
Length over all	48 ft. 11 in.
Truck wheelbase	4 ft. 10 in.
Width over all	8 ft. 6 in.
Height, rail to trolley base	11 ft. 6 in.
Body	Steel and wood
Interior trim	Statuary bronze
Headlining	Agasote
Roof	Arch
Air brakes	General Electric
Axles	Carnegie
Bearings	Brill center, Stucki side
Bumpers	Channel
Car signal system	Consolidated
Car trimmings	Brill
Control	General Electric C-169
Couplers	Tomlinson
Curtain fixtures	Railway Supply & Curtain Co.
Curtain material	Fabrikoid
Designation signs	Electric Service Supplies Co.
Door mechanism	National Pneumatic
Wheelguards	H-B
Hand brakes	Dayton No. 35, drop handle
Heater equipment	Consolidated Car Heating Co.
Headlights	Trolley Supply Co.
Journal boxes	Brill
Lightning arresters	General Electric
Motors	Westinghouse 535A and GE-275-H, outside hung
Paint	Chicago Varnish Co.
Registers	International R-10
Sanders	Electric Service Supplies Co.
Sash fixtures	Edwards
Seats	St. Louis
Seating material	Cane
Springs	Brill
Step treads	Kass
Trolley catchers	Ideal
Trolley base	U. S. No. 14
Trolley wheels or shoes	General Electric
Trucks	Brill 39-E
Ventilators	Railway Utility
Wheels (type and size)	Rolled steel, 28 in. and 22 in

Oil Output Increases 3,415 Barrels a Day

Crude oil production again showed an increase last week, the daily average output rising to 2,364,204 bbl., an advance of 3,415 bbl. from the preceding week, it was announced this week by the *Oil and Gas Journal.* This total compared with a daily average of $1,915,960 in the corresponding week last year.

The jump is accounted for by increases in Oklahoma and California, production in the former state rising to 607,820 bbl. daily, compared with 597,825 last week and 443,540 in the corresponding week a year ago. California output rose to 653,500 bbl. from 648,500 last week and 611,000 a year ago.

The Texas Panhandle continued to recede and reductions were reported from many other fields.

The detailed production figures compare as follows:

	Jan. 29, 1927	Jan. 22, 1927	Jan. 30, 1926
Oklahoma	607,820	597,825	443,540
Kansas	115,815	117,710	98,985
North, Central, West Texas	236,443	232,065	162,080
Texas Panhandle	127,498	131,185	....
East Central Texas	44,366	45,261	62,510
N. Louisiana	53,370	53,630	43,410
Arkansas	128,950	130,830	159,500
Gulf Coast	160,950	171,613	98,820
Southwest Texas	39,337	39,830	39,025
Rocky Mountain area	69,155	85,090	97,460
Eastern	107,000	107,250	99,600
California	653,500	648,500	611,000
Total	2,364,204	2,360,789	1,915,960

Kansas City Citizens Petition Council for Track Extensions

A petition signed by 600 citizens was filed with the City Council of Kansas City, Mo., asking that the Kansas City Public Service Company be permitted to extend its Jackson Avenue car line from 24th Street South to 39th Street. A provision of the railway franchise provides for this extension, and it is thought that the petition will be given consideration by a special committee now conducting negotiations for the new franchise.

New Booklet Contains Valuable Track Data

Paved-track data are presented in an attractive manner in a looseleaf book just issued by the International Steel Tie Company of Cleveland, Ohio. The book is prefaced by excellent color reproductions of oil paintings depicting the manufacture of steel in Cleveland's industrial center.

Some historical facts are presented leading up to the greater use of steel ties in trackwork and the modern conception of their economy in the paved track of today. Many pages are devoted to the details of the twin tie featured by this company, and drawings are reproduced showing not only many typical track sections, but special construction and features relative to the product and uses to which it is placed.

Cost data collected from many actual jobs is detailed and presented on a unit foot basis. Interspersed with engineering and cost facts are many photographs and excerpts from technical magazines showing work in progress and opinions or descriptions of men prominent in the railway industry.

An interesting feature of the track notebook is the report of an investigation made by D. D. Ewing, consulting engineer and professor of electrical engineering, Purdue University, on the noise produced by cars operated over various types of track. Tests were made by Professor Ewing in Cleveland, Ohio, Schenectady, N. Y., and Harrisburg, Pa., in which noise and also vibration were measured by means of an inverted radio receiving set.

Conclusions of Professor Ewing based on the tests made in these three cities are that the type of tie has no appreciable effect on the noise incident to car operation, and also that noise is a function of car speed. Data and charts measuring the noise in the several tests are reproduced.

The book closes with several tables of standard and special handbook data. The looseleaf feature allows of the continuing growth of the book as additional sheets are sent out by the company or by the addition of individual notes.

Haskelite Products Standard for Cars, Says Fitzpatrick

Writing in *Industrial Marketing* for January, 1927, James R. Fitzpatrick, secretary and director of sales of the Haskelite Corporation of Chicago, gives a graphic account of how his company was forced to seek other fields when ten days after the armistice orders on its books for airplane equipment amounting to $1,080,000 were canceled. Of particular interest is Mr. Fitzpatrick's outline of the reasons which led the company to invade the electric railway field. "It is generally accepted as true by practical street railway operators," he writes, "that it costs 6 cents a pound per annum to operate a street car, exclusive of passenger load. For a number of years the engineers of this field had been endeavoring to procure a light-weight street car. We decided this was our field.

"The result of our tests and efforts is that Haskelite products are today accepted as the standard in street car construction. A ¼-in. Haskelite roof replaces a ⅜-in. or ½-in. lumber roof; a 1/16-in. or ¼-in. Haskelite panel replaces a ⅜-in. composition board headlining; a ¼-in. Haskelite panel replaces solid lumber for interior trimmings; a ⅞-in. Haskelite plywood floor replaces the 1¼-in. solid lumber floor; a 5/16-in. plymetl replaces 12 to 16-gage steel for outside panels."

According to Mr. Fitzpatrick, the Chicago Surface Lines, Pittsburgh Railways, Detroit United Lines, Los Angeles Railways, Chicago & North Shore, Market Street Railway of San Francisco and Grand Rapids Railway are some of the large operators who make free use of Haskelite plymetl in the manufacture of their cars. Mr. Fitzpatrick also states that the company's products are standard in the manufacture of buses by the American Car & Foundry Company, Yellow Coach, Mack International, Garford Motor Company, the Six Wheel Company and others.

Rolling Stock

Reading Rapid Transit Company, Reading, Pa., has recently turned out another steel-framed car of the "800" type from its shops. Another car of this type is at present under construction and will be ready for service within a few weeks.

Cleveland Railway, Cleveland, Ohio, has approved a program of expenditures totaling $2,050,000. Among the items included are new cars and buses to the probable extent of 100 cars and 25 buses.

Key System Transit Company, Oakland, Cal., spent upward of $400,000 in trackwork in Oakland, Cal., during 1926, according to the company's report, just released. Forty new cars of the 900 type were added to the rolling stock and this type is now standard for the system. Twenty-seven new buses also were purchased at a cost of $238,997. The total expenditures for improvements during 1926 are set at nearly $4,500,000.

Milwaukee Electric Railway & Light Company will shortly commence the construction of de luxe coaches for its new Burlington-East Troy service. They will be built in the company's shops and along the same lines as those now in use on the Milwaukee-Waukesha-Watertown rapid transit line.

Shops and Buildings

Portland Electric Power Company, Portland, Ore., has completed improvements of its Jefferson substation which was started in 1925. The work involved an expenditure of about $250,000 and consisted of a 34x100 ft. extension which was erected while the plant was in constant operation. Provision has been made for housing 15,000 kw. in primary distribution transformers, 3,000 kw. in railway rotary converter transformers, switching equipment, distribution feed regulators, and a water cooling system for the transformers, etc. The station supplies some of the west side overhead feeders and also current for the underground feeders in the downtown district.

Illinois Traction System, Peoria, Ill., has sold to the Union Electric Light & Power Company, subsidiary of the North American Company, its Venice, Ill., power plant. Under the terms of the sale contract the Illinois Traction Company will purchase power from the Union Electric for a period of twenty years. The Illinois Traction Company is affiliated with the Illinois Power & Light Company, which operated the Venice plant. The Venice power plant is at the east end of the McKinley Bridge over the Mississippi River. It was built about twenty years ago, but within the past two years it has been modernized.

Trade Notes

Armco Culvert Association is the new name for the Armco Culvert & Flume Manufacturers' Association, effective Jan. 1.

Oil Jack Company, Inc., New York City, manufacturer of the Pederson "oiljack," is now located at 15 Park Row, having formerly had general offices in 110 West 40th Street.

Metal, Coal and Material Prices

Metals—New York	Feb. 1, 1927
Copper, electrolytic, cents per lb.	12.75
Copper wire, cents per lb.	15.125
Lead, cents per lb.	7.40
Zinc, cents per lb.	6.92
Tin, Straits, cents per lb.	66.50
Bituminous coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$5.075
Somerset mine run, Boston, net tons	2.525
Pittsburgh mine run, Pittsburgh, net tons	1.95
Franklin, Ill., screenings, Chicago, net tons	1.875
Central, Ill., screenings, Chicago, net tons	1.425
Kansas screenings, Kansas City, net tons	2.35
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$5.50
Weatherproof wire base, N.Y., cents per lb.	17.00
Cement, Chicago net prices, without bags	2.10
Linseed oil (5-bbl. lots), N. Y., cents per lb.	10.9
White lead in oil (100-lb. keg), N. Y., cents per lb.	14.50
Turpentine (bbl. lots), N. Y., per gal.	$0.82

Chicago & Northwestern Railroad has just ordered 120 Hyatt roller-bearing equipped cars. This, it is understood, is the largest order for roller bearings on record from the railroad field. The Hyatt company also reports that the Rock Island Railroad recently started an extensive test program on fifteen cars, specifying Hyatt roller bearings in connection with the experiments.

Relay Motors Corporation, recently incorporated to take over all assets of the Commerce Motor Truck Company of Ypsilanti, Mich., and Service Motors, Inc., Wabash, Ind., has announced the following officers for the amalgamated company: W. R. Bassick, chairman of the board of directors; G. L. Gillam, president; M. A. Holmes, vice-president; A. K. Cabel, secretary and treasurer; E. W. Bassick, director of policies. The new company will still manufacture the relay drive for trucks, which it considers one of the leading developments in the truck and bus fields.

A. B. Foster Company has recently opened its Chicago office at 231 La Salle Street, in charge of R. A. Foster, vice-president of the company.

Elliott-Fisher Company has acquired the business of the Sundstrand Corporation, manufacturer of Sundstrand adding, bookkeeping and calculating machines, with factories and general offices at Rockford, Ill. The Elliott-Fisher Company manufactures accounting-writing machines and has factories at Harrisburg, Pa., and general offices in New York. The latter company desired to supplement its line with equipment for the adding-bookkeeping field, and for that reason acquired the Sundstrand organization. The products of the two constituent organizations will be marketed by the General Office Equipment Corporation, a subsidiary of the Elliott-Fisher Company. The same officers of the General Office Equipment Corporation continue in the management of the organization, with executive and general sales offices at 342 Madison Avenue, New York.

The White Company, Cleveland, Ohio, announces a new sales district organization for its motor truck and buses with headquarters at 1045 Atlantic Avenue, Brooklyn, N. Y., as the result of separating the Brooklyn territory from the New York district. William McDaniels, formerly Brooklyn division manager, has been appointed district manager, and F. H. Laning, formerly of the home office in Cleveland, assistant district manager.

H. T. Heath, who is well known in the electric railway and automotive field of the Middle West, is now with the Illinois Motive Equipment Company, Chicago, Ill. Mr. Heath will handle sales and service of Johnson fare boxes in the Middle West. He was formerly connected with the Electric Devices Company, Hageman-Castle Corporation, Westinghouse Electric & Manufacturing Company and the Detroit Railway Supply Company.

Arthur F. Connally, formerly connected with the Goodrich Tire Company, has accepted the vice-presidency of the Millisco Advertising Agency, with headquarters in 1 Park Avenue, New York City.

Interior of Modern Cars of Chicago & Joliet Electric Railway

Modern Car Platforms Require—

"Peacock" Staffless Brakes!

Reg. U. S. Pat. Off.

That is one of the many reasons why they are included in the specifications of nearly all modern cars!

Note in the above illustration the small platform space occupied by the Peacock Staffless at the left of the motorman's seat.

They have three times the braking capacity of ordinary hand brakes,—almost unlimited chain winding capacity—144 inches if necessary—low installation and maintenance cost, simplicity of operation and are preferred by motormen.

There are many other factors that especially adapt Peacock Staffless Brakes to the most modern cars. May we tell you about them?

NATIONAL BRAKE CO., Inc.
Buffalo, N. Y.

What SUPERTWIST Adds to Goodyear Tires

One of the 100%-Goodyear-equipped motorbus fleet of Chicago and West Towns Railway Company

You know what rugged strength and long life have always been built into Goodyear Pneumatic Bus tires.

Now you may confidently expect even greater service from Goodyears in motorbus service, because Goodyear Pneumatic Bus Tires are now made with SUPERTWIST.

SUPERTWIST is the extra elastic, extra enduring new material specially developed by Goodyear for Goodyear balloon tires, motorbus and heavy duty cord tires.

It far outstretches ordinary cotton cord, and has a maximum flexing power that yields under impact, protecting the tire from rupture, stone bruise and other injuries. It thus insures virtually *double* the *carcass* life of the tire.

Other exclusive features of the Goodyear Pneumatic Tire construction for motorbus service are (1) the new Goodyear band-building method; (2) the new Goodyear breaker; (3) the new Goodyear bead—patent applied for, and (4) the famous All-Weather Tread.

These advantages you get only in Goodyear Pneumatic Bus Tires—the only motorbus tires made of SUPERTWIST.

They are real advantages, because they result in the utmost durability, tractive power, road safety, riding comfort and long, trouble-free mileage at low cost.

Goodyear Means Good Wear

GOODYEAR

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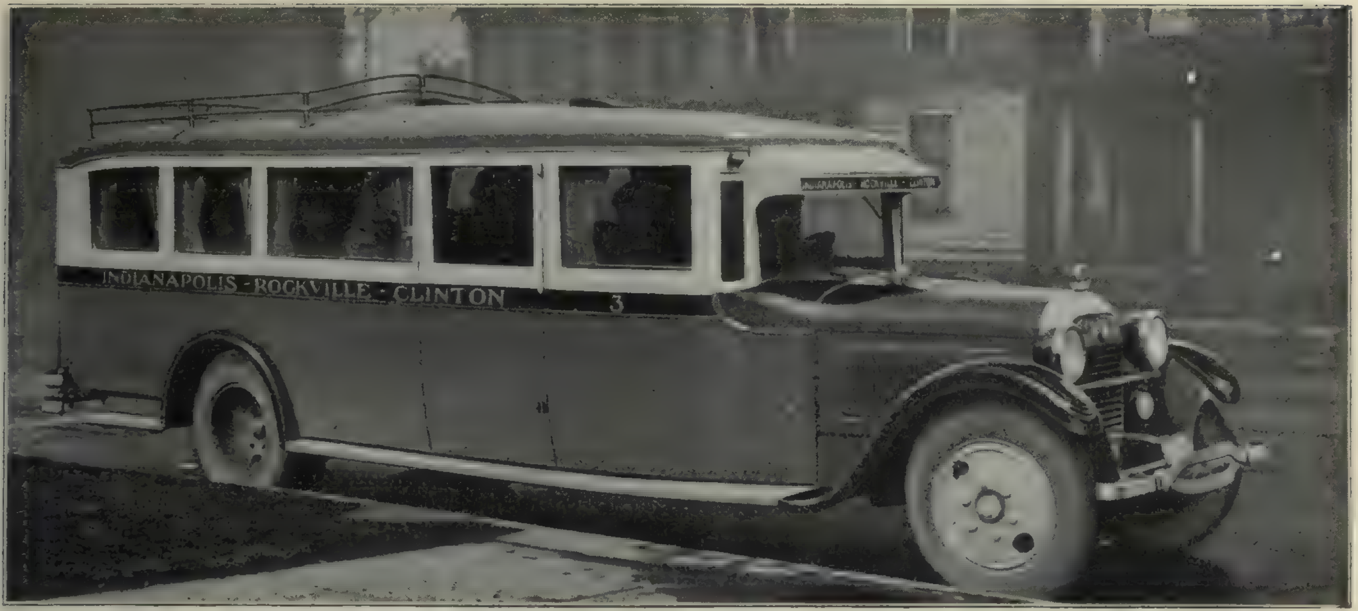

INDIANAPOLIS - ROCKVILLE - CLINTON
3
INDIANAPOLIS - ROCKVILLE - CLINTON

"It is the easiest job to drive I have ever handled"

W. L. PLATTER, of Platter & Baldwin, Rockville, Indiana, owners of the Indianapolis-Rockville-Clinton Bus Line *knows* busses and the value of proper equipment. Daily observation of various types of busses entering and leaving the great Indianapolis terminal enables him to determine the relative value of motor busses.

Because of this, his following statements concerning his Studebaker busses are well worth regarding.

> "On the run between Indianapolis and Clinton, a distance of 81 miles, road conditions in some seasons are none too good. Mud, snow, steep hills and sharp curves all exert certain handicaps but the easy driving qualities and ample power of the Studebaker motor enables us to maintain our schedules without excessive driver fatigue.
>
> "This line is showing a good profit even at seasons when travel is naturally light and this is because our Studebaker busses are most economical to operate and their fine appearance plus their easy riding qualities attract and hold our patronage."

Lower
—first cost
—operating cost
—maintenance cost
—depreciation cost

Six Body Designs, 12 to 21 Passengers
$3935 to $6150

Prices f. o. b. factory, covering body and chassis, complete. Purchase can be arranged on a liberal Budget Payment Plan—Small down payment and balance in convenient monthly installments.

12-Pass. (including driver) cross-seat Sedan-Type	$3935
15-Pass. (including driver) cross-seat Sedan-Type	$4295
18-Pass. (including driver) side-entrance Parlor Car	$5300
19-Pass. (including driver) cross-seat Sedan-Type	$5050
20-Pass. (including driver) Parlor-Car De Luxe*	$6150
21-Pass. Pay-As-You-Enter Street-Car Type*	$5125

*Includes dual rear wheels

These remarks are typical of the many reports received from every section of the country where Studebaker busses, operating independently or as feeders to traction lines, are popular, profit producing units.

Most Powerful Bus Chassis of Its Size and Weight

Based on the rating of the Society of Automotive Engineers, the Studebaker bus chassis is the most powerful of its size and weight in the world. There are 66 bus chassis on the market with more weight per horsepower than the Studebaker chassis.

As proved by nearly 300 Studebaker busses with records of more than 100,000 miles, this chassis gives literally scores of thousands of miles of thoroughly dependable service at exceptionally low operating cost—and minimum depreciation.

THE STUDEBAKER CORPORATION OF AMERICA
Dept. B, South Bend, Ind.
Send me full information on Studebaker Busses without obligation

Name..
Address..
City.. State......................
We have..busses at present.
Check below the Studebaker Bus about which you desire information.
Type: Sedan..................Parlor Car..............Street-Car Type..................
Capacity:.. ......Passengers.

New York KNOWS—

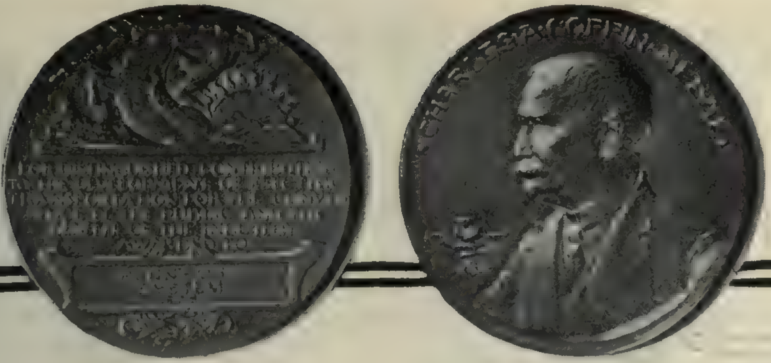
WINTER snows bring the peak-load in metropolitan street-cleaning; with interrupted food distribution, increased fire risk, hampering of business. It is no time for uncertainties in equipment. New York City *knows.*

Timken Axles were an important factor in New York's recent selection and purchase of 189 GMC Trucks—7-ton and 5-ton—equipped with Timken Axles, front and rear.

Experienced truck and coach operators know that Timken Axles are good assurance of uninterrupted service, mechanical reliability, low upkeep.

THE TIMKEN-DETROIT AXLE CO., DETROIT, MICH.

TIMKEN
AXLES



The Coffin Award, made to the Penn-Ohio System, Youngstown, Ohio, "for distinguished contribution to the development of electric transportation for the convenience of the public and the benefit of the industry."

Recognition . . . .

NOT one single excellence—but many excellences—bring that coveted thing: recognition. How is recognition achieved? In the public utilities field, it's a question of *choice*—choice of those elements which go into the making and operation of street railway equipment which stand for the best, each element the best in its field of usefulness.

The Penn-Ohio System, for the street railway cars illustrated, chose Duco as the material with which their cars were to be finished. Duco was one—of the many—excellences that made for the *excellence of the complete unit*—Duco helped in achieving that recognition!

DUCO
REG. U.S. PAT. OFF.

There is only ONE Duco
—DU PONT Duco

Duco is the correct finishing material for railway equipment. For information write to the E. I. du Pont de Nemours & Co., Inc., Chemical Products Division, Parlin, N. J., Chicago, or San Francisco.

Why bus owners are turning to Kelly-Springfields

OF course we don't claim that every Kelly Heavy-Duty Cord will give such remarkable service, but we do know—and letters like these prove it—that Kellys have unusual mileage built into them. Bus owners are finding that Kellys give them less trouble and more mileage than other bus tires they have used. Kellys on your busses will lower tire costs and make tire changing much less frequent.

Acme Coach Line
Cadillac, Michigan
June 3rd, 1926.

Kelly-Springfield Tire Co.,
5900 Cass Ave.,
Detroit, Mich.

ATTENTION Mr. C. D. Cole

Gentlemen:-

I noticed your ad in the June issue of Bus Transportation in which you featured our Acme Coach showing front Kelly-Springfield tires, which had run over 48,995 miles.

Wish to state that both of these tires went well over 50,000 miles, one going 51,700 miles and the other 59,665 miles. This certainly is exceptional mileage over gravel roads which often times are badly rutted from thawing and freezing and no time too smooth.

Believing your Company will continue to make the same high class tires that they have in the past. I am,

Very truly yours,
L. B. Donnelly

73

BUS TRANSPORTATION

June, 1926

Look good for another 10,000 after running almost 50,000 miles

THE experience of bus operators with Kelly Heavy-Duty Cords tells the story of greater mileage and lowered operating costs better and more convincingly than anything we ourselves might write. Kellys give good service to large and small operators alike, and increase their profits by cutting costs.

Kelly-Springfield Tire Co.
250 West 57th Street, New York, N. Y.

KELLY HEAVY DUTY CORD

Once a bus owner has tried Kelly Heavy - Duty Cords after using other makes, he usually standardizes on Kellys as exclusive equipment. Such letters as the one printed above tell their own story and need no comment from us.

KELLY - SPRINGFIELD
TIRE COMPANY
250 WEST 57th STREET
NEW YORK, N. Y.

a.c.f.
Hall-Scott
A.C.&F. GAS ELECTRIC
A.C.&F. ST. CAR
234
60
horsepower
90
horsepower

90 Horsepower

Both are Hall-Scott Sixe

ALL the genius which originated the low-swung parlor car type of coach is now also available in a coach of more moderate size. It means that today every operator of full-fledged buses may have the benefit of a. c. f. responsibility and a. c. f. universal mass transportation experience, bringing many definite extra measures of value.

a. c. f. resources and high standing guarantee a degree of responsibility which protects each coach through every mile, and throughout all the years that it will serve you.

All a. c. f. engineering facilities have been intensively applied to still higher development of the coach which started the era of automotive mass transportation. As a result a. c. f. coaches are capable of lowest-cost car miles, and their attractiveness to the public is also an assurance of the most passenger miles per car.

The Right Foundation

The reasons for a. c. f. maintenance economy and high total mileage are nowhere more apparent than in the chassis frames themselves. Extreme low suspension, achieved on a practical basis, contributed largely to the early sensational success of the safety coaches now manufactured by American Car and Foundry Motors Company. Today these frames represent doubtless the most exhaustive engineering in bus history. The power plant, drive and body are entirely free from the effects of frame distortion. Operators are permanently protected from risk and cost in connection with frames.

a. c. f. *Hall-Scott Power*

Conceded to be one of the finest power plants ever developed, the 90 h. p. a. c. f. Hall-Scott engine has long been standard for the larger a. c. f. coach of 230-inch wheelbase. Specialized coach engineering and extreme economy are apparent in countless points of Hall-Scott design. The entire valve mechanism, including the camshaft, is carried by the cylinder head. All valve work is bench work; a spare head carried on hand prevents lay-ups for valve work. Cylinder block design is so simplified, that instead of laying up a vehicle for regrinding, it is often more economical to install a spare block.

The hardest alloy steel crankshaft manufactured for gas engines is employed, and the bearings are fitted by an automatic method—with usual care 50,000 miles or even 100,000 miles of faultless operation may be expected from Hall-Scott motors before they require anything but routine attention.

A New Hall-Scott Creation

Carburetion, combustion and lubrication also benefit by Hall-Scott science,

60 Horsepower

—and both are by A. C. F.

which has now been applied to a smaller engine—the 60 h. p. A. C. F. Hall-Scott motor, for the new A. C. F. coach of 198-inch wheelbase. With a displacement of 332 cubic inches, the latest Hall-Scott achievement makes possible more than 60 horsepower at only 1800 r.p.m. Long life and economy are apparent. Yet there is all the power and agility to enable A. C. F. coaches to get under way with "flashy" cars, and hold a pace which permits unequaled daily schedules.

Hall-Scott power in buses of moderate size is truly an opportunity for operators. Types of vehicles which have been "converted" or "adapted" from other automotive fields need be acceptable no longer. For the first time a smaller chassis assures all the comprehensive, specialized, creative engineering which first brought about high-speed, long-distance luxury travel by motor.

Chassis Equally Advanced

Vibration, dilution and other possibilities of wear and trouble are literally *designed out* and permanently kept out of A. C. F. Hall-Scott engines. Rubber mounting and similar devices to keep vibration merely from being felt are unnecessary. Just so, all the elements of safety, comfort, endurance and economy are inherent throughout the design. The long, wide, flat springs, made to work far under the critical limits, provide highest protection for passengers, body and chassis. Specially developed 4-wheel brakes, automatic chassis lubrication, carefully worked out driving control, and a host of other betterments typify the advancements to be expected in latest A. C. F. models.

16-Passenger Parlor Car
21-Passenger Street Car

Joined to the value of A. C. F. mechanical excellence there is always the fact that appearance, comfort and reputation have earned public preference for these coaches. That is why A. C. F. coaches have often replaced others and produced extra revenue which previously did not seem to exist in those particular territories!

If you have thought A. C. F. success associated only with larger coaches, investigate the smaller chassis in the 16-passenger parlor car type and 21-passenger street car body. These buses command consideration before any equipment order is placed.

AMERICAN CAR AND FOUNDRY
MOTORS COMPANY
30 CHURCH STREET, NEW YORK
FACTORIES: DETROIT, MICHIGAN
and BERKELEY, CALIFORNIA

A.C.F Mechanical Drive

The chassis of 230-inch wheelbase is available with 29-Passenger and 31-Passenger Street Car bodies; with 26-Passenger Parlor Car body and with 60-Passenger Fully-Enclosed Double-Deck body.

The chassis of 198-inch wheelbase is available with 21-Passenger Street Car body and 16-Passenger Parlor Car body.

* * *

A.C.F Gas-Electric Drive

The Gas-Electric chassis of 230-inch wheelbase is available with 29-Passenger and 31-Passenger Street Car bodies; and with 60-Passenger Fully-Enclosed Double-Deck body.

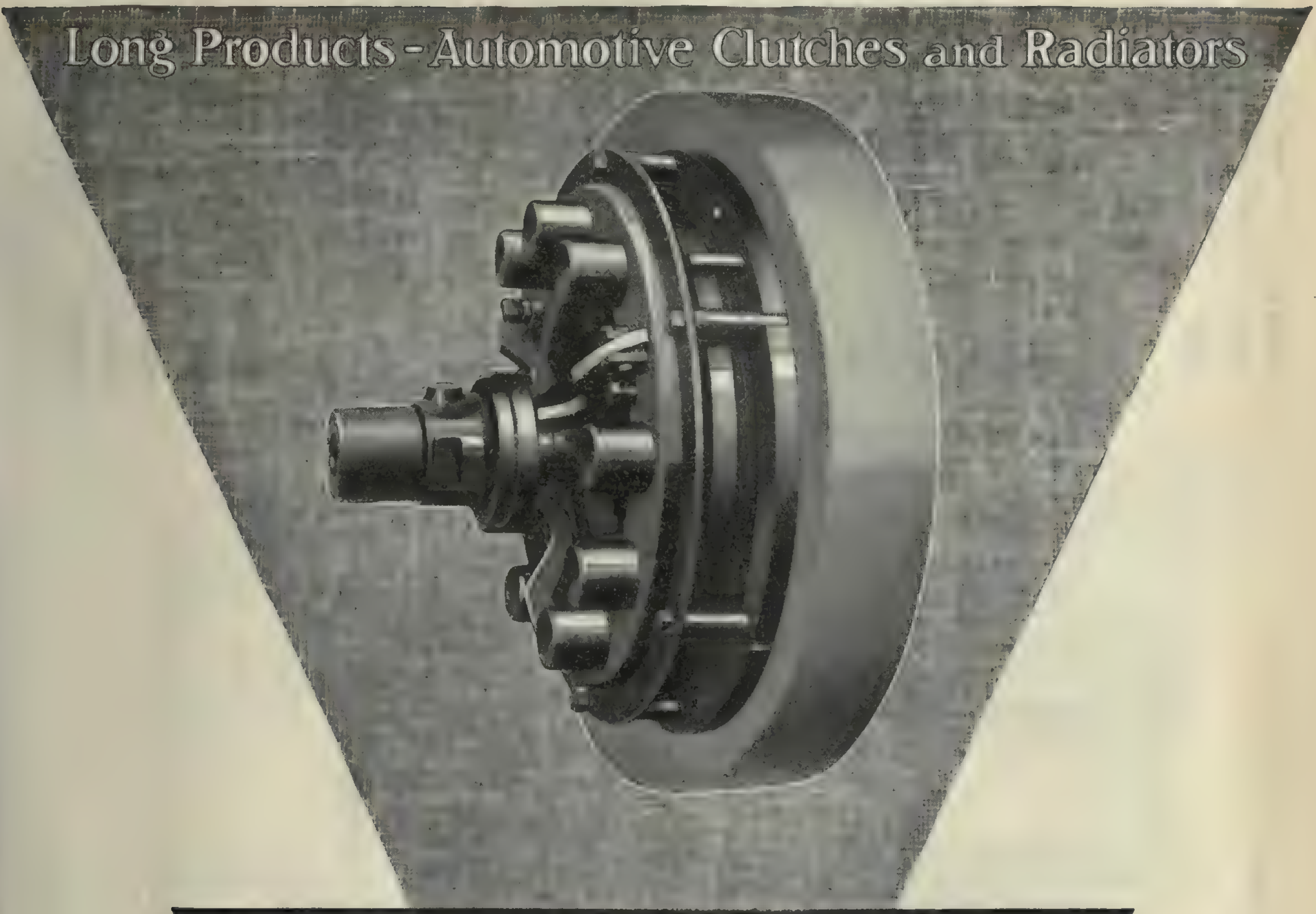
Write for complete specifications. Upon request the A.C.F Transportation Staff will serve you broadly in connection with any coach transportation problem.

* * *

AMERICAN CAR AND FOUNDRY MOTORS COMPANY
30 CHURCH STREET, NEW YORK

FACTORIES: DETROIT, MICHIGAN *and* BERKELEY, CALIFORNIA

ACF
Hall-Scott



Accurately engineered and proven in its worth, the Long Clutch makes for the utmost in smooth, silent clutch operation.

We are offering you this service.

THE LONG MANUFACTURING COMPANY
DETROIT MICHIGAN

LONG

windows DO MAKE A DIFFERENCE in *winning* good will

Modern car for Montreal Tramways, by Canadian Car & Foundry Co. Edwards Metal Sash is used.

Durable
Easy to Operate
Noiseless

Easily Cleaned
Light in Weight
Air-tight

YOU can measure the future of your operations by the extent to which you modernize your equipment.

Edwards Metal Sash wins good will because it meets the modern trend in car design.

Old-fashioned, noisy, drafty, heavy, fist-defying windows are replaced in Edwards construction with modern, silent, air-tight, smooth-sliding metal sash that gives a maximum of clear vision.

Car builders can furnish Edwards Metal Sash in a type to fit your needs. Specify it on your next order, and ask us to send you your copy of our Catalog S which describes all types of Edwards Metal Sash.

O. M. EDWARDS COMPANY
SYRACUSE, N. Y.
New York **Chicago**
Canadian Representatives: Lyman Tube & Supply Co. Ltd., Montreal and Toronto

Edwards Metal Sash

101 YEARS OF MANUFACTURING EXPERIENCE

Snow sweeper rattan and cane webbing may be ordered through any H-W sales office.

HEYWOOD-WAKEFIELD SEATS CHOSEN AFTER PRACTICAL TEST

TO offset the inroads made by busses, a midwestern Electric Railway Company (name on request) determined to increase the attractiveness and comfort of its cars. Sample cars, equipped by three seat manufacturers, were operated in a six months' practical service test.

The above installation of our seat No. 55-P, without arm rest and with attractive grip rail, was selected by the public and the company as the most handsome, comfortable and practical.

Our car seating experts will be glad to help in selecting the seats best suited to your needs. This service is free, without any obligation on your part, through any Heywood-Wakefield sales office.

If you have not received a copy of our new Bus Seat Catalogue, write for it.

Heywood-Wakefield

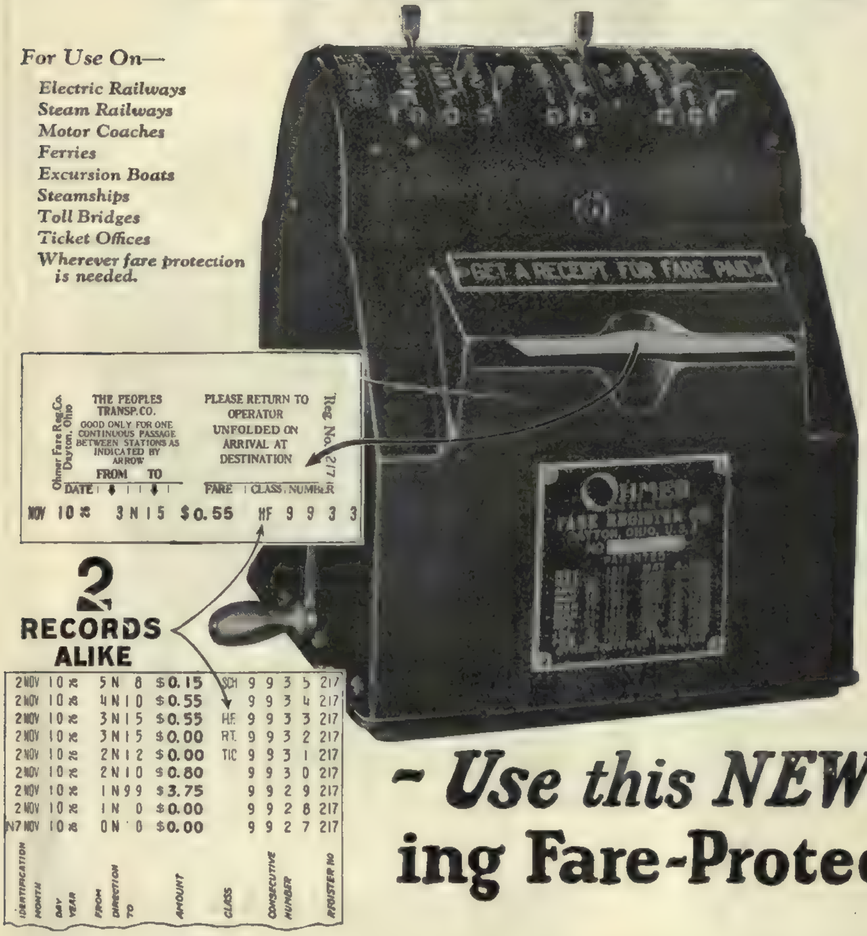
REG. U.S. PAT. OFF.

Heywood-Wakefield Co., Wakefield, Mass.
Heywood-Wakefield Co., 516 West 34th St., New York, N. Y.
Heywood-Wakefield Co., 439 Railway Exchange Bldg., Chicago, Ill.
Frank N. Grigg, 630 Louisiana Ave., Washington, D. C.
Herbert G. Cook, Hobart Bldg., San Francisco, Calif.
The G. F. Cotter Supply Co., Houston, Texas
The Railway and Power Engineering Corporation,
133 Eastern Ave., Toronto; Montreal; Winnipeg, Canada

Get *All* Your Money from Fares Sold

For Use On—

- *Electric Railways*
- *Steam Railways*
- *Motor Coaches*
- *Ferries*
- *Excursion Boats*
- *Steamships*
- *Toll Bridges*
- *Ticket Offices*
- *Wherever fare protection is needed.*



Ohmer Fare Reg. Co. Dayton, Ohio

THE PEOPLES TRANSP. CO.
GOOD ONLY FOR ONE CONTINUOUS PASSAGE BETWEEN STATIONS AS INDICATED BY ARROW

PLEASE RETURN TO OPERATOR UNFOLDED ON ARRIVAL AT DESTINATION

Reg. No. 217

DATE			FROM		TO	FARE	CLASS	NUMBER
NOV	10	26	3	N	15	$0.55	HF	9933

2 RECORDS ALIKE

IDENTIFICATION	MONTH	DAY	YEAR	FROM	DIRECTION	TO	AMOUNT	CLASS	CONSECUTIVE NUMBER	REGISTER NO
2	NOV	10	26	5	N	8	$0.15	SCH	9935	217
2	NOV	10	26	4	N	10	$0.55		9934	217
2	NOV	10	26	3	N	15	$0.55	HF	9933	217
2	NOV	10	26	3	N	15	$0.00	RT	9932	217
2	NOV	10	26	2	N	12	$0.00	TIC	9931	217
2	NOV	10	26	2	N	10	$0.80		9930	217
2	NOV	10	26	1	N	99	$3.75		9929	217
2	NOV	10	26	1	N	0	$0.00		9928	217
N7	NOV	10	26	0	N	0	$0.00		9927	217

10 Big Features

1. Prints and issues complete ticket.
2. Prints untamperable duplicate record of each ticket inside the register.
3. Eliminates preprinted tickets.
4. Enforces proper accounting of every ticket sold.
5. Removes temptation.
6. Stops carelessness.
7. Protects passengers.
8. Makes inspection easier.
9. Eliminates detail work in auditor's office.
10. Compact, light weight, portable, low cost

– Use this NEW Ticket-Printing Fare-Protecting Register*!*

THE New Ohmer Ticket-Printing Register, Type 79, absolutely enforces a correct accounting of every fare sold. It instantly stops the leaks and losses that cost transportation companies enormous sums. Where this new fare-protecting register is used, mistakes, carelessness, and dishonesty are practically eliminated. If any exist, they are immediately detected and responsibility fixed. You know at the end of each trip just how much money you should receive. And you will get that much money or *know the reason why.*

The Ohmer Ticket-Printing Register, Type 79, prints and issues tickets as sold. A duplicate untamperable record of each of these tickets is printed and locked up inside the register. This record is automatically and instantly made as the ticket is issued—a record that safeguards your interests from the time the ticket is sold until the money is turned in to the cashier.

Regardless of the kind of transportation you are selling, the use of this register will result in a tremendous saving for you. Let us send you the proof. Let us show you how it will eliminate detail work, stop losses, and increase profits—all at a cost that is surprisingly low. A letter or wire will bring you complete information without obligation of any kind.

OTHER OHMER PRODUCTS

- **Fare Registers**
- **Fare Boxes**
- **Printing Taximeters**
- **Atco Taximeters**
- **Odometers**
- **Hub Odometers**
- **Recordografs**

OHMER
REG. U.S. PAT. OFF.
Transportation Recording Devices

OHMER FARE REGISTER COMPANY
Dept. Y DAYTON, OHIO, U. S. A.

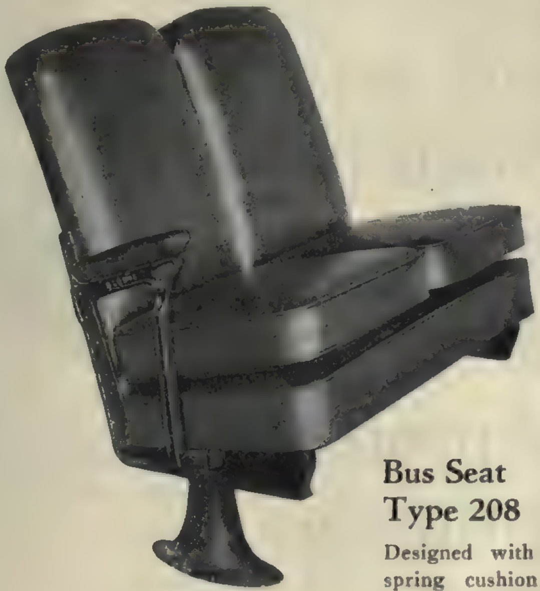
PUT TRANSPORTATION ON A BUSINESS BASIS

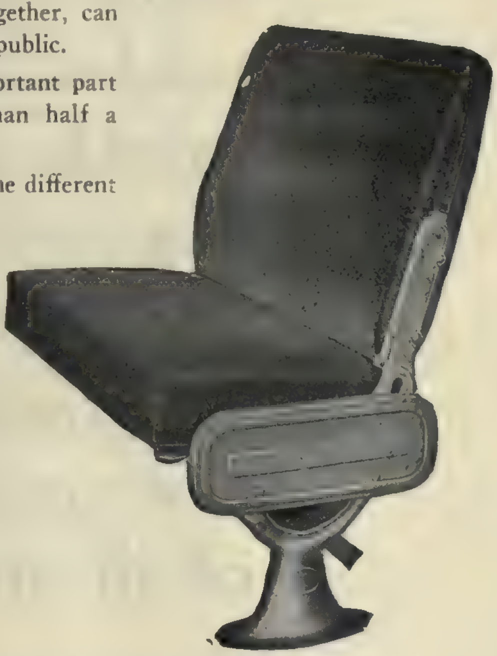
Standardize on comfort —for both car and bus seats

Though the type of service on both car and bus varies—from urban to suburban to interurban—comfort can tie them all together, can give them a common basis on which to attract the riding public.

In this connection Hale-Kilburn Seats play an all-important part —for their luxurious comfort is the result of more than half a century's seat-making experience.

Ask for our catalogs to get complete information about the different types.





Bus Seat Type 208

Designed with divided back and spring cushion and air cushion pads, this is an exceptionally graceful and comfortable double chair for DeLuxe service.

Car Seat Type 199-F

Built with plush upholstered spring edge cushion and detachable back, this inexpensive but comfortable seat is well adapted for suburban and light-weight interurban cars.

HALE-KILBURN COMPANY

General Offices and Works: **1800 Lehigh Avenue, Philadelphia**

SALES OFFICES:

Hale-Kilburn Co., 30 Church St., New York
Hale-Kilburn Co., McCormick Bldg., Chicago
E. A. Thornwell, Candler Bldg., Atlanta
Frank F. Bodler, 903 Monadnock Bldg., San Francisco
Chris Eccles, 320 S. San Pedro St., Los Angeles
T. C. Coleman & Son, Starks Bldg., Louisville
W. L. Jefferies, Jr., Mutual Bldg., Richmond
W. D. Jenkins, Praetorian Bldg., Dallas, Texas
W. D. Jenkins, Carter Bldg., Houston, Texas
H. M. Euler, 46 Front St., Portland, Oregon

Hale and Kilburn SEATS

An increasingly large portion of the actual income derived from car card advertising service must be devoted to building and maintaining the prestige of car card advertising in the face of the active competition of all other media.

Creating and protecting our mutual interest is a costly item.

Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

THIS de luxe car of the Columbus, Delaware & Marion Electric Company is equipped with "STANDARD" Rolled Steel Wheels.

Rolled Steel Wheels

Quenched and Tempered Carbon Steel Axles

Armature Shafts

Coil and Elliptic Springs

STANDARD STEEL

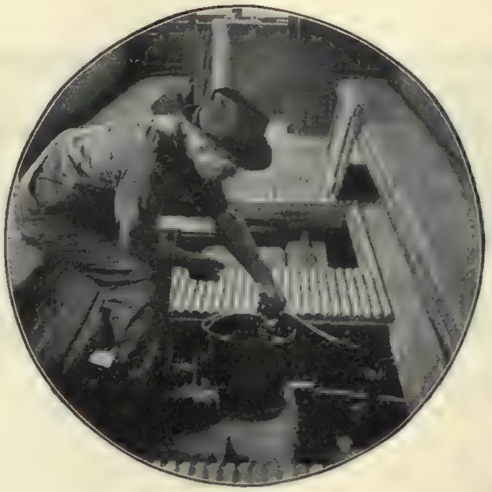
WORKS COMPANY

PHILADELPHIA, PA.

BRANCH OFFICES:

Chicago
St. Louis
New York
Portland, Ore.
Richmond, Va.
San Francisco
St. Paul, Minn.
Pittsburgh, Pa.
Houston, Texas

WORKS: BURNHAM, PA.



Lubricate and Protect Gears and Pinions with
TEXACO CRATER COMPOUND

Texaco Crater Compound has the faculty of clinging to gear teeth despite speed and pressure so that constant effective lubrication is secured at all times.

This lubricant stands up well under temperature conditions and due to its length of life it insures economical lubrication.

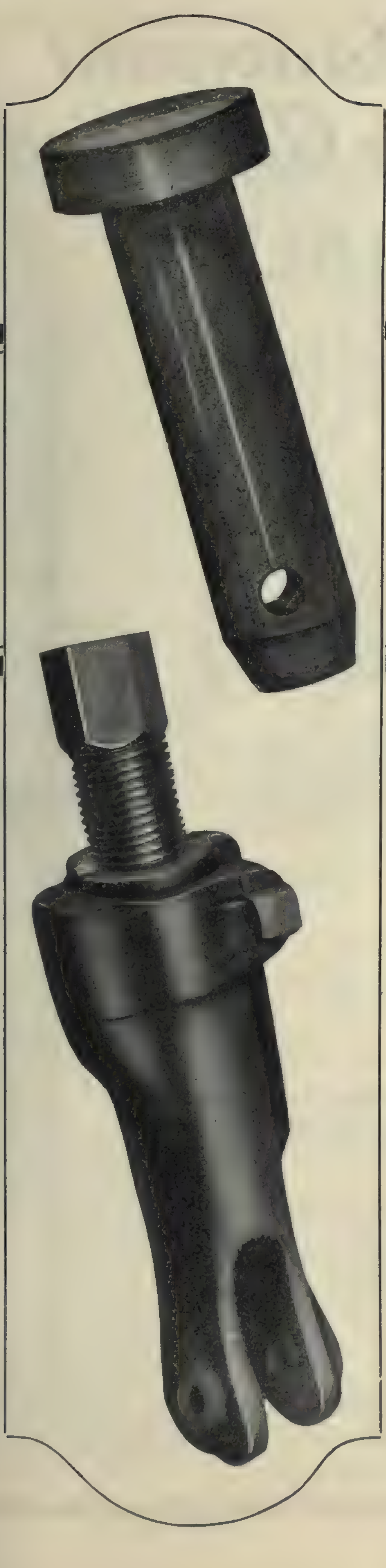
It prevents wear, thus increasing the life of the gears and pinions.

It has the same high quality that is daily increasing the demand for the rest of the Texaco Lubricants for electric street railways.

We shall be glad to make a complete survey of your line and make specific recommendations. No obligation is involved. We are glad of the opportunity to demonstrate our ability to assist you.

There is a Texaco Lubricant for Every Purpose

TEXACO
THE TEXAS COMPANY
DEPT. R.J. 17 BATTERY PLACE . NEW YORK CITY
HOUSTON . CHICAGO . NEW YORK
OFFICES IN PRINCIPAL CITIES
TEXACO



"BOYERIZE
to
ECONOMIZE"

Improved practice pays! Boyerized Car Parts represent improved and modern practice! They cut operating expenses, (even though they cost a trifle more) because they outlast ordinary steel parts three to four times.

The real saving comes when frequent replacements are eliminated, costly labor minimized, breakdowns reduced and accidents prevented.

Equip one of your cars with Boyerized Parts. Try them under any conditions and note their ability to stand up under the most severe service strains.

Pick the items you need from the following list. Then send for quotations.

- Brake Pins
- Brake Hangers
- Brake Levers
- Bushings
- Center Bearings
- Side Bearings
- Chafing Plates
- Manganese Brake Heads
- Manganese Truck Parts
- McArthur Turnbuckles

Bemis Car Truck Company
Electric Railway Supplies
Springfield, Mass.

Representatives:
Economy Electric Devices Co., Old Colony Bldg., Chicago, Ill.
F. F. Bodler, 903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney, 54 First Street, Portland, Ore.
J. H. Denton, 1328 Broadway, New York City, N. Y.
A. W. Arlin, 772 Pacific Electric Bldg., Los Angeles, Cal.

Where Safety is Paramount and Appearance is Appreciated

"NATIONAL"

Electric Line

POLES

are generally used because

First:

Their great strength and the ductile quality of the steel offer maximum protection both to the company and the public.

Second:

They do not detract from the appearance of the finest street; they present a neat appearance and are unobtrusive in the most beautiful surroundings.

Third:

They economize space, which is always desirable and often quite necessary.

Fourth:

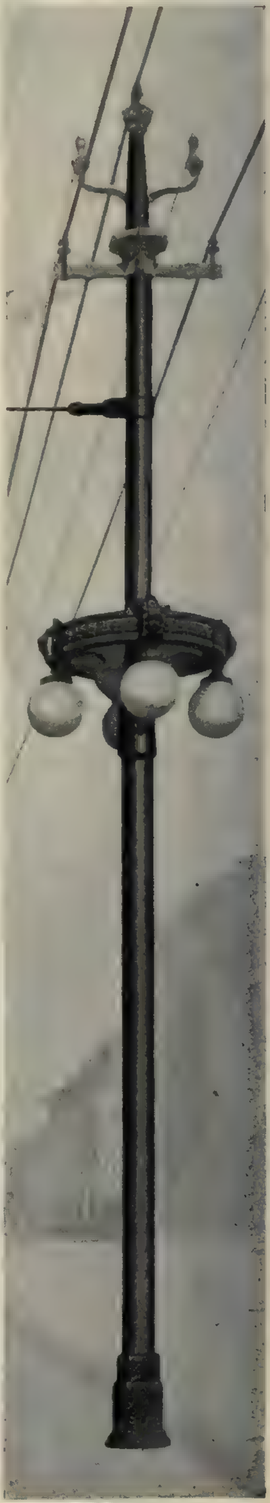
Experience of street railways with their overhead construction points to less interruption, lower up-keep, greater reliability and longer life for these poles.

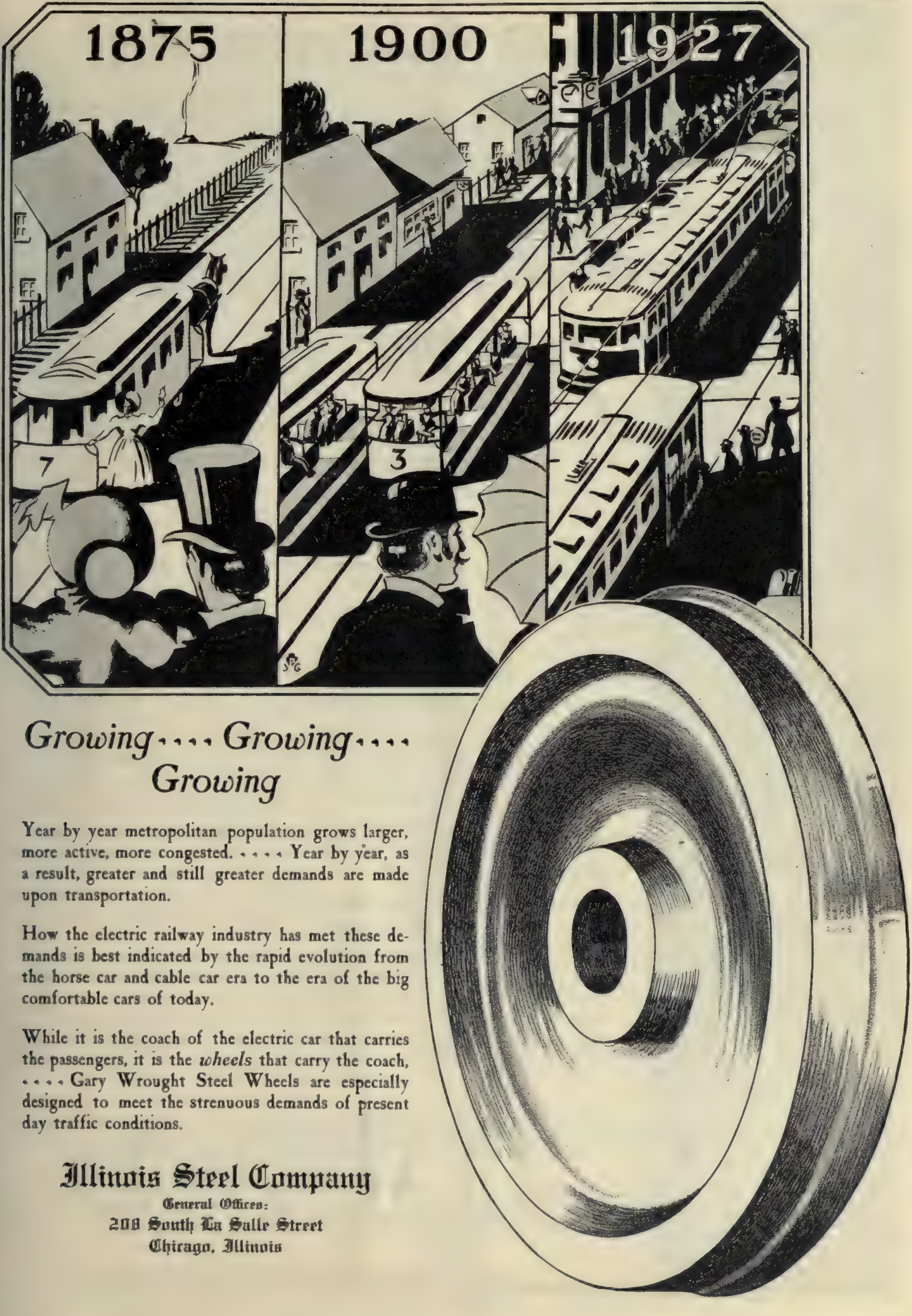
Specify "NATIONAL" Poles, made by the largest manufacturer of Tubular Products in the world, with facilities for meeting a wide range of specifications in pole construction.

NATIONAL TUBE COMPANY

Frick Building, Pittsburgh, Pa.

DISTRICT SALES OFFICES IN THE LARGER CITIES





Growing . . . . Growing . . . . Growing

Year by year metropolitan population grows larger, more active, more congested. . . . . Year by year, as a result, greater and still greater demands are made upon transportation.

How the electric railway industry has met these demands is best indicated by the rapid evolution from the horse car and cable car era to the era of the big comfortable cars of today.

While it is the coach of the electric car that carries the passengers, it is the *wheels* that carry the coach. . . . . Gary Wrought Steel Wheels are especially designed to meet the strenuous demands of present day traffic conditions.

Illinois Steel Company
General Offices:
208 South La Salle Street
Chicago, Illinois

America's Permanent Lumber Supply

Forever...

a permanent lumber supply for electric railways

WEST of the Rocky Mountains is more timber that will make lumber than *all* of the lumber that has been manufactured in the states of Maine, New Hampshire, Vermont, Massachusetts, New York, Pennsylvania, Michigan, Wisconsin and Minnesota since the Revolutionary War. The greater portion of this enormous forest wealth *is concentrated in the Douglas Fir forests of the Pacific Northwest*—where prolific natural reforestation assures a continuous lumber supply.

Now and forever the Douglas Fir forests of the West Coast will answer the call of America's railways for lumber and big timbers that are strong, stiff and durable; that resist warping and checking; that are light in weight.

Every electric railway structural grade, together with special sizes and lengths, always can and always will be furnished *on grade* promptly.

Douglas Fir is a superior material for car floors, furring, roofs and trolley boards, because of its strength, stiffness and durability and the large clear sizes (all heartwood if necessary) in which it can be obtained. Ties, trestles, waiting shelters, stations, poles, cross-arms, etc., in fact any structure or equipment of wood is stronger and more resistant to weather when of Douglas Fir.

Specific information in support of these statements will be furnished on request. *Address*, West Coast Lumber Bureau, 5562T Stuart Building, Seattle, Washington.

Typical forest monarchs of the Pacific Northwest
Photos by Cress, Seattle

Durable Douglas Fir
America's Permanent Lumber Supply

W118R

Important West Coast Woods
Douglas Fir - West Coast (Sitka) Spruce - West Coast Hemlock - Western Red Cedar

What Wrought Steel means to wheel users

Carnegie Wheels are made of wrought steel—homogeneous structure obtained after the steel has been thoroughly rolled, hydraulically forged under 10,000 ton presses and then rolled again. There is no possibility of sand spots, blow holes or any irregularity that might cause fracture. In the steam railroad field, Wrought Steel Wheels are specified under passenger cars and pullmans—where safety is essential. Under street cars they will give that same safety.

Carnegie Wrought Steel Wheels are 'multiple-wear" wheels—meaning that when ordinary wheels are ready for the scrap pile, multiple-wear wheels are getting their second wind. The cost of turning or contour conditioning is trifling compared to the cost of a new wheel.

"Carnegie" stamped on a wheel is a synonym for economical wheel service.

Booklet on Request.

CARNEGIE STEEL COMPANY

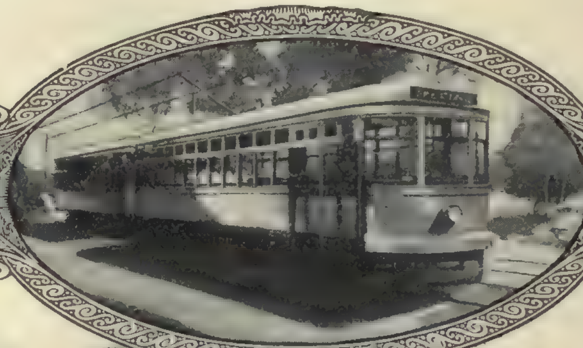
General Offices • Carnegie Building • 434 Fifth Avenue
PITTSBURGH PENNSYLVANIA

1847

EMPIRE BOLTS & NUTS

THEN AND NOW

All things change with time. The transportation methods of our childhood days look hopelessly primitive now, yet they were the last word at the time. And Empire bolts and nuts were used to hold them together just as they are on the highly efficient models of today. Empire bolts and nuts have kept pace with the changes in transportation methods. Your shop men should know them by name. *Send for samples.*



RUSSELL, BURDSALL & WARD
BOLT & NUT COMPANY
PORT CHESTER, N.Y.

Branch Office:
Straus Building
CHICAGO

Branch Office:
General Motors Bldg.
DETROIT

Branch
Factory:
ROCK FALLS, Ills.

Strimple & Gillette
169 Jackson Street
SEATTLE

Maydwell & Hartzell, Inc.
158-168 Eleventh Street
SAN FRANCISCO

Makers of Bolts, Nuts and Rivets Since 1845

50 Plants—Daily Capacities 20,000 Wheels

Locomotive
Competition
at Ranhill,
England,
1829

Chilled Car Wheels

Chilled Car Wheels
for increased mileage
and minimum rail wear

One of the many new cars
equipped with Chilled Wheels

A. R. A. Standards
650 lb. Wheel for 30 Ton Cars 750 lb. Wheel for 50 Ton Cars
700 lb. Wheel for 40 Ton Cars 850 lb. Wheel for 70 Ton Cars

ASSOCIATION OF MANUFACTURERS OF
CHILLED CAR WHEELS
1847 McCORMICK BUILDING, CHICAGO

Jamestown saves valuable barn space!

with

EASTON

Turntables!

Through the use of turntables the Jamestown Street Railway Company, Jamestown, N. Y., is enabled to turn its single end one-man Birney Cars in their own length—and *without the construction of costly* special track-work. Thus at a large saving in initial expense they also eliminate the danger of "backing out." And the maintenance of the turntable is practically nil—at most a few cents for lubrication. And the ease with which one man turns the table surprised them!

There are many places where an Easton Turntable can be used to economic advantage—for turning cars, buses, railcars, etc.—for use in shops and garages—in saving valuable floor space—in saving time and labor—in expediting servicing and shop facilities—as a combined turntable and bus washing platform—and many others.

Investigate the many money-saving features of this equipment today!

NEW YORK
KANSAS CITY
PHILADELPHIA

EASTON CAR & CONSTRUCTION CO.
Easton, Pa.

PITTSBURGH
CHICAGO
SAN FRANCISCO

Complete satisfaction

Operating perfectly and requiring minimum attention for maintenance and lubrication, Earll Catchers and Retrievers give genuinely satisfactory results. Their refinement of design and mechanical superiority are summarized in the following five features, peculiar to Earll construction.

No-wear Check Pawl
Free-Winding Tension Spring
Ratchet Wind
Emergency Release
Perfect Automatic Lubrication

Earll Catchers and Retrievers

C. I. EARLL, York, Pa.

Canadian Agents:
Railway & Power Engineering Corp., Ltd., Toronto, Ont.
In All Other Foreign Countries:
International General Electric Co., Schenectady, N. Y.

COLUMBIA

Railway Supplies and Equipment

Machine and
Sheet Metal Work

Forgings
Special Machinery
and Patterns

Grey Iron and
Brass Castings

Armature and
Field Coils.

The
Columbia Machine Works
and M. I. Co.
265 Chestnut St., corner Atlantic Ave.,
Brooklyn, N. Y.

Mauran, Russell & Crowell, Architects; Herbert H. Morrison, Consulting Engineer

ANNOUNCEMENT

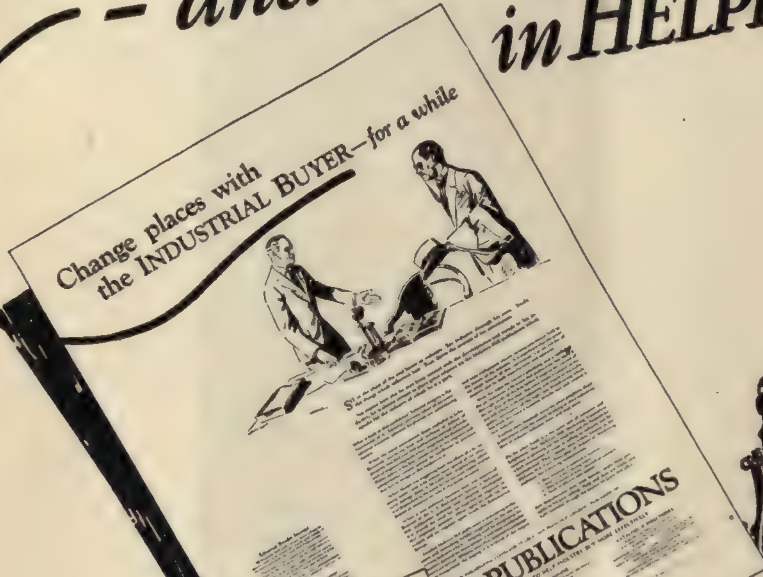
To more conveniently and more efficiently serve central-southern and south-western manufacturers and their advertising agents, the McGraw-Hill Publications have opened new and larger quarters in St. Louis. The new location is:

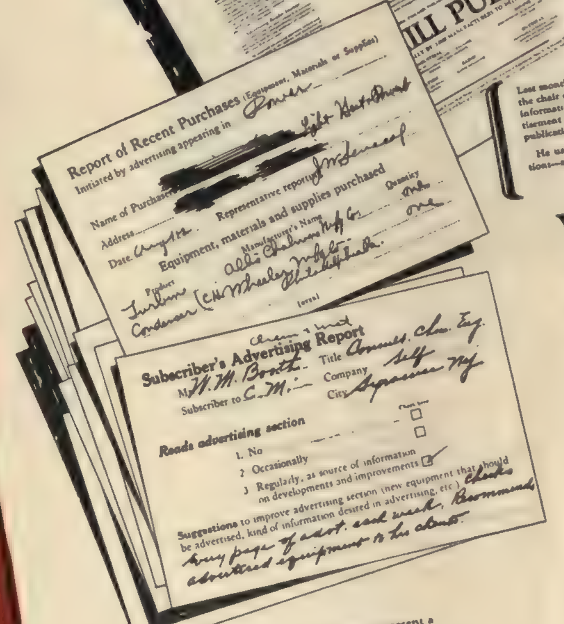
1556 Southwestern Bell Telephone Building,
St. Louis
Phone: Main 1060

This change permits of increased facilities for serving the rapidly developing central-south and south-west territory. Manufacturers and advertising agents are cordially invited to make use of this conveniently located office.

McGraw-Hill Publishing Company, Inc.
New York Chicago Philadelphia St. Louis San Francisco London

— and study his interest in HELPFUL ADVERTISING





Report of Recent Purchases (Equipment, Materials or Supplies)
Initiated by advertising appearing in Power
Name of Purchaser [redacted] Light Heat & Power
Address [redacted]
Representative reporting J W Senecal
Date Aug 1 12
Equipment, materials and supplies purchased

Product	Manufacturer's Name	Quantity
Turbine	Allis Chalmers Mfg Co	one
Condenser	(C H Wheeler Mfg Co Philadelphia	one

(over)

Subscriber's Advertising Report
Mr W. M. Booth Title Consult. Chem. Eng.
Subscriber to C. M. Chem & Met Company Self
City Syracuse N.Y.

Reads advertising section

1. No ☐
2. Occasionally ☐
3. Regularly, as source of information on developments and improvements ☑

Suggestions to improve advertising section (new equipment that should be advertised, kind of information desired in advertising, etc.) checks every page of advt. each week, Recommends advertised equipment to his clients.

Stacks of records, like the above, represent a census of the Industrial Buyer's interest in the advertising pages of certain industrial publications . . . those published by McGraw-Hill Field investigations such as this also record actual purchases resulting from this interest. These records substantiate both the observation made by Mr. Brosseau and the previous basic survey made for McGraw-Hill.

Last month McGraw-Hill invited the Industrial Seller to sit in the chair of the typical Industrial Buyer to study the sources of information he regularly depends upon and why. That advertisement gave only part of the story—his dependence upon publications of established editorial integrity.

He uses more than the editorial helpfulness of such publications—and that is the other part of the story discussed here.

WHAT is the attitude of the Industrial Buyer toward the advertising that aims to make him a customer?

What kind of advertising interests and influences him . . . and why?

. . . Vital questions, these, in this day and age of highly specialized selling!

The well-known investigation of industrial buying practices made for McGraw-Hill a few years ago showed that industry's buyers look to Industrial Publications as the best means of keeping their industries up-to-date on methods, machinery and materials.

Why do the advertising pages of Industrial Publications command this confidence and interest?

The answer is given by Mr. A. J. Brosseau, President, Mack Trucks, Inc., who speaks authoritatively as a subscriber to Industrial Publications and as an advertiser in Industrial Publications. Mr. Brosseau stated before a recent gathering of business paper editors that:

> "The publication which is doing a leadership job editorially is *transferring* to the publication's *advertising pages* the prestige which it creates among its readers."

Advertising, surrounded by constructive, confidence-building editorial matter, reaches the Industrial Buyer under the most favorable circumstances.

Another reason for the Industrial Buye
favorable viewpoint toward the advertising pa
of Industrial Publications is the special help
ness he finds in the advertisements themsel
They reflect an understanding of the pecu
operating and producing problems of indu
that gains and holds the Industrial Bu
interest and respect.

Advertising conceived from this stand
knuckles down to the business of selling in
in industry's own manner and language.

These are the reasons behind the in
prospect's interest in the advertising
McGraw-Hill Publications. Is your ad
the kind that meets his specifications?

• • •

How to use industrial advertising to
advantage . . . how to coordinate it
selling job to be done . . . these are
study stipulated in the McGraw-Hill F
ples of Industrial Selling which, briefly

1. Determination of worthwhile
2. Analysis of their buying habits
3. Determination of direct cha
approach.
4. Study of effective sales appea

The help and data of the McGr
ization are fully and freely avail
facturers and their advertising a
the nearest McGraw-Hill office.

McGRAW-HILL PUBLISHING COMPANY, INC., NEW YORK, CHICAGO, PHILADELPHIA, CLEVELAND, ST. LOUIS, SAN FRANCISCO, LONDON. PUBLISHERS OF

McGRAW-HILL PUBLICATI

000 ADVERTISING PAGES USED ANNUALLY BY 3,000 MANUFACTURERS TO HELP INDUSTRY BUY MORE EFFECT

INDUSTRIAL
MACHINIST
INDUSTRIAL ENGINEER
RGICAL ENGINEERING

MINING
ENGINEERING & MINING JOURNAL
COAL AGE

OVERSEAS
TERNACIONAL

CATALOG
ELECTRIC
ELECTRICAL
RADIC
KEYSTONE COAL MININ
KEYSTONE COAL BUYER
CENTRA
ELECTRI
COA
ANALYSIS OF

THIS ADVERTISEMENT REPORTS TO YOU

The main purpose in reproducing in this McGraw-Hill Publication the advertisement on the opposite page is to point out another step in our effort to make the advertising pages of your publication more helpful to you. It discusses investigations made among our subscribers at different times. Perhaps you contributed information to the cause.

The fact is, if the advertiser recognizes that he must square his advertising with the problems of operation and production with which you are concerned, he helps both you and himself.

In regularly studying the advertising pages of this and other McGraw-Hill Publications you have undoubtedly observed that much progress has been made toward this goal. While this thought is fresh in mind run through the advertising pages of this issue again and notice how many advertisers recognize this new spirit of advertising.

The advertisement on the opposite page was directed to advertisers through the following publications:

Printers' Ink Monthly
Advertising & Selling
Sales Management
Finance & Industry
New York Times
New York Herald Tribune
Chicago Journal of Commerce
Boston News Bureau
Wall Street Journal

PUBLICITY DEPARTMENT
McGraw-Hill Publishing Company, Inc.
Tenth Avenue at 36th Street
New York

Whatever your requirements

specify

Le Carbone Carbon
Brushes

They talk for themselves

W. J. Jeandron
Hoboken Factory Terminal,
Building F, Fifteenth Street, Hoboken, N. J.
Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street
Canadian Distributors: Lyman Tube & Supply Co., Ltd.
Montreal and Toronto

ELECTRICAL
INSULATION

PERFECT MICANITE INSULATOR REG. U.S. PAT. OFF. and PERFECT EMPIRE INSULATOR REG. U.S. PAT. OFF.

Micanite and Super-Micanite Sheets, Commutator Segments, and Commutator Rings

Micanite Tubes and Washers

Linotape, Seamless or Sewn Bias *(Yellow or Black Varnished Tapes)*

Empire Oiled Cloths and Papers *(Yellow or Black)*

Compounds, Varnishes, Etc.

Send for catalog and helpful booklet on Commutator Insulation and Assembly

MICA INSULATOR COMPANY
Largest manufacturers in the world of mica insulation.
Established 1893
New York: 68 Church St. Chicago: 542 So. Dearborn St.
Cleveland Pittsburgh Cincinnati
San Francisco Los Angeles Seattle
Works; Schenectady, New York; Victoriaville, Canada; London, England

This Paper is a
"Member *of the* A.B.P."

To you, this is a fact of especial significance, for it means that this publication is part of a concerted movement to raise the level of publishing practice, to assure better service to both subscribers and advertisers.

The "A.B.P." is built upon and revolves around the following set of standards—

STANDARDS *of* PRACTICE

THE publisher of a business paper should dedicate his best efforts to the cause of Business and Social Service, and to this end should pledge himself—

1. To consider, first, the interests of the subscriber.
2. To subscribe to and work for truth and honesty in all departments.
3. To eliminate, in so far as possible, his personal opinions from his news columns, but to be a leader of thought in his editorial columns, and to make his criticisms constructive.
4. To refuse to publish "puffs," free reading notices or paid "write-ups"; to keep his reading columns independent of advertising considerations, and to measure all news by this standard: "Is it real news?"
5. To decline any advertisement which has a tendency to mislead or which does not conform to business integrity.
6. To solicit subscriptions and advertising solely upon the merits of the publication.
7. To supply advertisers with full information regarding character and extent of circulation statements, subjects to proper and authentic verification.
8. To co-operate with all organizations and individuals engaged in creative advertising work.
9. To avoid unfair competition.
10. To determine what is the highest and largest function of the field which he serves, and then to strive in every legitimate way to promote that function.

Publications which have subscribed to these standards have earned the preferred consideration accorded them.

THE ASSOCIATED
BUSINESS PAPERS, INC.
52 Vanderbilt Ave., New York

What will 1927 mean to YOU?

Next year you will be a year older. Will you be a year advanced? Will your job be a year better? Will your pay be a year bigger? You can take care of this for yourself—you can make 1927 your best year yet—with the

American Electricians' Library

Six Volumes—over 2000 pages—fully illustrated Special durable library binding

$2.00 in ten days and $2.00 monthly for 7 months

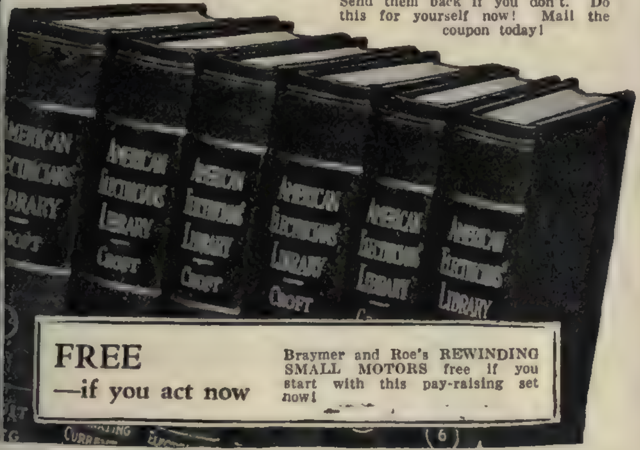
This pay-raising Croft Library will help you to make yourself expert in solving the problems of repair and installation of electrical equipment in dozens of different big-pay electrical fields. The six volumes are:

- Volume I—Conduit Wiring.
- Volume II — A. C. Armature Winding.
- Volume III—Electrical Machinery and Control Diagrams.
- Volume IV—Lighting Circuits and Switches.
- Volume V—Circuit Troubles and Testing.
- Volume VI—Electrical Machinery Erection.

Big-pay information. It will pay you well to get it. It will mean big things for you in 1927. No investment can mean more to you.

Send no money—See the books free

Mail the coupon below. See the books free. Keep them if you want them. Send them back if you don't. Do this for yourself now! Mail the coupon today!



FREE —if you act now

Braymer and Roe's REWINDING SMALL MOTORS free if you start with this pay-raising set now!

McGRAW-HILL

FREE EXAMINATION COUPON

McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York.

Gentlemen:—Please send me the CROFT AMERICAN ELECTRICIANS' LIBRARY (shipping charges prepaid), for 10 days' free examination. If satisfactory, I will send $2.00 in ten days and $2.00 a month until the special price of $16.00 has been paid. If not wanted I will write you for return shipping instructions. When my first payment of $2.00 is received you are to send me my free copy of Braymer and Roe's REWINDING SMALL MOTORS.

Name ....

Home Address ....

City .... State ....

Position ....

Name of Company .... E 2-5-27

Nuttall

Standard Helical Gears

The contact between a gear tooth and a pinion tooth is a combination of sliding and rolling, and the sliding contact is the cause of wear.

In Nuttall Helical Gears this sliding contact is at least 50% less than in spur gears, so the wear is materially reduced, and is uniformly distributed over the entire contact surface. As a consequence the teeth retain their correct involute form until worn to a sharp edge.

This results in longer wear, longer life, less maintenance cost, less renewal cost, and it is perfectly true to say that while Nuttall BP Helical Gearing is the longest-lived in the world, it is the cheapest.

Do you want to see actual operating cost data to prove this?

Write for our Helical Gear Book

R.D.NUTTALL COMPANY

PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railways and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

Nuttall

Bankers and Engineers

Ford, Bacon & Davis
Incorporated
Engineers
115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

STONE & WEBSTER
Incorporated
EXAMINATIONS REPORTS APPRAISALS
ON
INDUSTRIAL AND PUBLIC SERVICE PROPERTIES
New York Boston Chicago

SANDERSON & PORTER
ENGINEERS
PUBLIC UTILITIES & INDUSTRIALS
Design Construction Management
Examinations Reports Valuations
CHICAGO NEW YORK SAN FRANCISCO

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER, MASSACHUSETTS
REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

A. L. DRUM & COMPANY
Consulting and Constructing Engineers
VALUATION AND FINANCIAL REPORTS
RATE STUDIES FOR PRESENTATION TO PUBLIC SERVICE COMMISSIONS
CONSTRUCTION AND MANAGEMENT OF ELECTRIC RAILWAYS
230 South Clark Street, Chicago, Ill.

STEVENS & WOOD
INCORPORATED
ENGINEERS AND CONSTRUCTORS
120 BROAWAY, NEW YORK
ENGINEERING CONSTRUCTION YOUNGSTOWN, O. FINANCING MANAGEMENT

HEMPHILL & WELLS
CONSULTING ENGINEERS
Gardner F. Wells Albert W. Hemphill
APPRAISALS
INVESTIGATIONS COVERING
Reorganization Management Operation Construction
43 Cedar Street, New York City

C. B. BUCHANAN, President W. H. PRICE, JR., Sec'y-Treas. JOHN F. LAYNG, Vice-President
BUCHANAN & LAYNG CORPORATION
Engineering and Management, Construction,
Financial Reports, Traffic Surveys
and Equipment Maintenance
BALTIMORE
1904 Citizens National Bank Bldg.
Phone: Hanover: 2142
NEW YORK
49 Wall Street

The J. G. White Engineering Corporation
Engineers—Constructors
Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.
43 Exchange Place New York

THE BEELER ORGANIZATION
ENGINEERS AND CONSULTANTS
Traction - Traffic - Equipment - Power Investigations
TRANSPORTATION, TRAFFIC, AND OPERATING SURVEYS
COORDINATING SERVICE—FINANCIAL REPORTS
APPRAISALS—MANAGEMENT
52 Vanderbilt Ave. New York

Byllesby Engineering & Management Corporation
231 S. La Salle Street, Chicago
New York San Francisco

ENGELHARDT W. HOLST
Consulting Engineer
Appraisals Reports Rates Service Investigation
Studies on Financial and Physical Rehabilitation
Reorganization Operation Management
683 Atlantic Ave., BOSTON, MASS.

DAY & ZIMMERMANN, INC.
ENGINEERS
DESIGN - CONSTRUCTION - REPORTS
VALUATIONS - MANAGEMENT
NEW YORK PHILADELPHIA CHICAGO

WALTER JACKSON
Consultant on Fares and Motor Buses
The Weekly and Sunday Pass—Differential Fares—Ride Selling
143 Crary Ave., Mt. Vernon, N. Y.

KELKER, DELEUW & CO.
CONSULTING ENGINEERS
REPORTS ON
Operating Problems Valuations Traffic Surveys
111 W. Washington Street, Chicago, Ill.

McCLELLAN & JUNKERSFELD
Incorporated
ENGINEERING AND CONSTRUCTION
Examinations—Reports—Valuations
Transportation Problems—Power Developments
68 Trinity Place, New York
Chicago St. Louis

THE BABCOCK & WILCOX COMPANY
85 Liberty Street, New York

Builders since 1868 of Water Tube Boilers of continuing reliability

BRANCH OFFICES
Boston, 49 Federal Street
Philadelphia, Packard Building
Pittsburgh, Farmers Deposit Bank Building
Cleveland, Guardian Building
Chicago, Marquette Building
Cincinnati, Traction Building
Atlanta, Candler Building
Phoenix, Ariz., Heard Building
Dallas, Tex., 2001 Magnolia Building
Honolulu, H. T., Castle & Cooke Building
Portland, Ore., 805 Gasco Building

THE BABCOCK & WILCOX COMPANY STEAM

WORKS
Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

BRANCH OFFICES
Detroit, Ford Building
New Orleans, 344 Camp Street
Houston, Texas, 1011-13 Electric Building
Denver, 444 Seventeenth Street
Salt Lake City, 405-6 Kearns Building
San Francisco, Sheldon Building
Los Angeles, 404-6 Central Building
Seattle, L. C. Smith Building
Havana, Cuba, Calle de Aguiar 104
San Juan, Porto Rico, Royal Bank Building

TULC A LUBRICANT

We make a specialty of
ELECTRIC RAILWAY LUBRICATION
We solicit a test of TULC on your equipment
The Universal Lubricating Co.
Cleveland, Ohio
Chicago Representatives: Jameson-Ross Company.
Straus Bldg

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY
Johnstown, Pa.
Sales Offices:
Atlanta Chicago Cleveland New York
Philadelphia Pittsburgh Dallas
Pacific Coast Representative:
United States Steel Products Company
Los Angeles Portland San Francisco Seattle
Export Representative:
United States Steel Products Company, New York, N. Y.

THE P. EDWARD WISH SERVICE
50 Church St. NEW YORK
Street Railway Inspection DETECTIVES
131 State St. BOSTON

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

UNA
RAIL BONDS-RAIL JOINTS
DYNAMOTORS
WELDING ROD
UNA Welding & Bonding Co.
Cleveland, Ohio.

Transmission Line and Special Crossing Structures, Catenary Bridges
WRITE FOR OUR NEW DESCRIPTIVE CATALOG
ARCHBOLD-BRADY CO.
Engineers and Contractors SYRACUSE, N. Y.

Gets Every Fare
PEREY TURNSTILES or PASSIMETERS
Use them in your Prepayment Areas and Street Cars
Perey Manufacturing Co., Inc.
101 Park Avenue, New York City

ILLINOIS MOTIVE EQUIPMENT COMPANY
J. D. Elsom, President
RAILWAY AND AUTOMOTIVE SUPPLIES
35 EAST WACKER DRIVE, CHICAGO
WESTERN REPRESENTATIVES:
JOHNSON FARE BOXES
METAL TICKETS COIN CHANGERS

DUFF JACKS
TRADE MARK
IT'S LIGHT ON DUFF JACKS
Genuine Barrett Jacks for every purpose
Duff Pinion Puller Safe—Quick—Positive
The Duff Manufacturing Co.
Est. 1883
PITTSBURGH, PA.
BRANCH OFFICES: *ATLANTA - CHICAGO - HOUSTON - NEW YORK - ST. LOUIS - SAN FRANCISCO*

RAILWAY UTILITY COMPANY
CAR COMFORT WITH UTILITY
HEATERS
REGULATORS
VENTILATORS
141-151 West 22d St. Chicago, Ill.
Write for Catalogue
1328 Broadway New York, N. Y.

PANTASOTE
Trade Mark
Seat and Curtain Materials
There is no substitute for Pantasote

AGASOTE
Trade Mark
Roofing—Headlining—Wainscoting
The only homogeneous panel board

*standard
for electric railway cars
and motor buses*

The PANTASOTE COMPANY Inc.
At 46th Street 250 Park Avenue
NEW YORK

People's Gas Bldg., Chicago, Ill.

Tribloc Chain Hoists
equipped with our
"Ezeejoin" Shackle

This improvement ends the possibility of poor welds when renewing the load chains in Ford Triblocs.

Any handy man can take out the old load chain and replace it with a new one in a few minutes.

The Tribloc Hoist has spur gears; the highest efficiency, which is 80%. Made of malleable iron and drop-forged steel parts throughout.

Send for Bulletin 4G
FORD CHAIN BLOCK COMPANY
2nd and Diamond Streets, Philadelphia, Pa.

FORD
TRI-BLOC

2247-D

R 11 Double Register

Both our latest single and double registers are now equipped for electric as well as mechanical hand or foot operation.

Full Electric
Operation of
Fare Registers

A completely satisfactory fare registration system is one that has the confidence of the public, the conductor and the accounting department. The simplicity and accuracy of International Registers maintained for more than thirty years, is combined in the later types with the extra speed and convenience of electric operation.

The International Register Co.
15 South Throop St., Chicago

THE WORLD'S STANDARD
"IRVINGTON"
Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slott Insulation Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.
Irvington, N. J.
Sales Representatives in the Principal Cities

ELRECO TUBULAR POLES

COMBINE
Lowest Cost Lightest Weight
Least Maintenance Greatest Adaptability

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO
New York City, 30 Church Street

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00,

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches..............$4.50 an inch
4 to 7 inches.............. 4.30 an inch
8 to 14 inches.............. 4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

POSITIONS WANTED

ADVERTISING and public relations specialist, extensive experience in electric railways, will make preliminary survey if desired. PW-966, Electric Railway Journal, 1600 Arch St., Phila., Pa.

OPERATING man; capable of taking charge of transportation department of electric railway. Practical experience in each of its branches. Highest references. PW-944, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

SUPERINTENDENT of rolling stock, 24 years' experience, open for position. PW-960, Electric Railway Journal, Tenth Ave. at 36th St., New York.

FOR SALE

15 BIRNEY SAFETY CARS

Brill Built

West. 508 or G. E. 264 Motors
Cars Complete—Low Price—Fine Condition

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

FOR SALE

BIRNEY CARS

In First-Class Condition

WH-508 and GE-264 Equipment

Inspection Invited

Apply to

Eastern Mass. St. Ry. Co.
1 Beacon Street, Boston, Mass.

12 miles **70-lb. ASCE Relayers.**
10 miles **60-lb. ASCE Relayers.**

practically as good as new. Also 12 miles 4/0 figure 8 Copper Wire practically new.

M. K. FRANK
Park Row Bldg. New York City
Union Trust Bldg. Pittsburg, Penna.

SAVE 30% TO 50% ON

RAILS-LOCOMOTIVES-CARS

Economy—Service
Quality—Reliability

HYMAN-MICHAELS COMPANY

Peoples Gas Bldg., Chicago

ST. LOUIS — DALLAS — LOS ANGELES
SAN FRANCISCO — PORTLAND — SEATTLE

AIR COMPRESSORS

12 General Electric CP-27.
6 General Electric CP-28.
16 Westinghouse DH-16.

IRVING S. VAN LOAN CORPORATION
1750 Broadway, New York City

Specialists in street cars or any part of a street car.
Illustrated bulletin supplied on request.

Today's Prices Are Highest

Let "Searchlight" Help You

The quicker idle equipment is sold, the higher the selling price it can demand—today's prices are always highest because—

Equipment permitted to remain unused depreciates rapidly and occupies valuable space. Every day of idleness brings down the possible selling price.

"Searchlight" Locates Quick Buyers

The wise owner of idle equipment promptly informs the field of his desire to sell through an advertisement in the Searchlight Section, where he knows that those who might need what he has will be most likely to look first.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Westinghouse Air Brake Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co

Armature Shop Tools
Columbia Machine Works
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Cincinnati Car Co.
Illinois Steel Co.
National Ry. Appliance Co.
Standard Steel Works Co.
Westinghouse E. & M. Co.

Axles (Front and Rear) Motor Truck and Passenger Car
Timken-Detroit Axle Co., The

Axles, Steel
Carnegie Steel Co.

Axles, Trailer & Motor Bus
Timken-Detroit Axle Co., The

Babbitting Devices
Columbia Machine Works

Badges and Buttons
Elec. Service Supplies Co.
International Register Co.

Barges, Steel
American Bridge Co.

Bearings and Bearing Metals
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
General Electric Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Columbia Machine Works
Stucki Co., A.

Bells and Buzzers
Consolidated Car Heating Co.

Bells and Gongs
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
Elec. Service Supplies Co.

Benders, Rail
Railway Track-work Co.

Bodies, Bus
Brill Co., The J. G.
Cummings Car & Coach Co.

Body Material, Haskelite and Plymetl
Haskelite Mfg. Corp.

Boilers
Babcock & Wilcox Co.

Boiler Tubes
National Tube Co.

Bolts, Nuts, Rivets
Russell, Birdsall & Ward Bolt & Nut Co.

Bolts and Nuts, Track
Illinois Steel Co.

Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.

Bonds, Rail
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Book Publishers
McGraw-Hill Book Co., Inc.

Braces, Timber
Duff Mfg. Co.

Braces, Trench
Duff Mfg. Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)
American Bridge Co.
Columbia Machine Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co. The J. G.
Cincinnati Car Co.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
American Brake Shoe & Foundry Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Wheel Truing Brake Shoe Co.

Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Co.
General Electric Co.
National Brake Co.
Westinghouse Tr. Br. Co.

Brakes, Magnetic Rail
Cincinnati Car Co.

Bridges, Steel
American Bridge Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Westinghouse E. & M. Co.

Brushholders
Columbia Machine Works

Buildings Steel
American Bridge Co.

Bulkheads
Haskelite Mfg. Corp.

Bunkers, Coal
American Bridge Co.

Buses, Motor
Brill Co., The J. G.
Cummings Car Coach Co.
Studebaker Corp. of Amer.
Yellow Truck & Coach Co.

Bushings, Case Hardened and Manganese
Brill Co., The J. G.
Bemis Car Truck Co.
Cincinnati Car Co.
Columbia Machine Works

Cables. (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.

Cambric Yellow and Black Varnish
Mica Insulator Co.

Carbon Brushes (See Brushes, Carbon)

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Car Steps, Safety
Cincinnati Car Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co. Inc.

Cars, Gas-Electric
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

Cars, Gas, Rail
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Continued on page 60

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Continued on page 63

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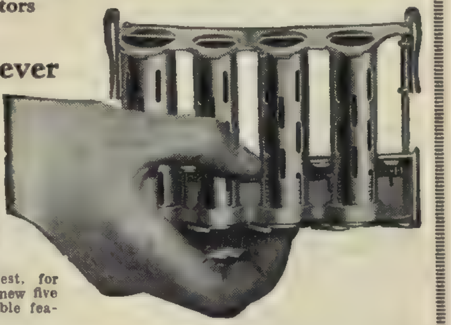

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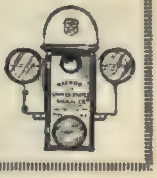

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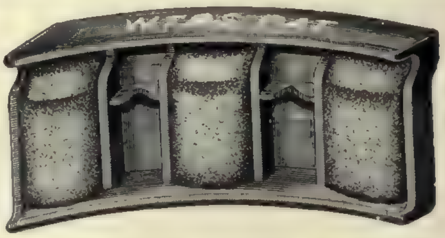

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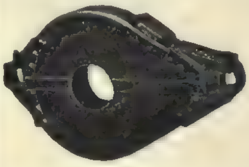

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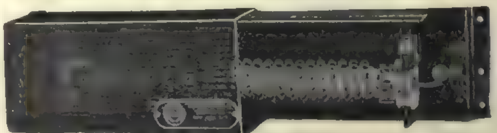

No.
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GOLD CAR HEATING & LIGHTING CO., BROOKLYN, N. Y.

ALPHABETICAL INDEX TO ADVERTISEMENTS

Page

A

American Brass Co., The 61
American Bridge Co. 59
American Car Co. 65
American Car and Foundry Motors Co. Front Cover and Insert 29-30-31-32
American Electrical Works 61
American Insulating Machinery Co. 62
American Steel & Wire Co. 61
American Steel Foundries 6
Anaconda Copper Mining Co. 61
Archbold-Brady Co. 55
Asso. of Mfrs. of Chilled Car Wheels 47

B

Babcock & Wilcox Co. 55
Beeler Organization 54
Bemis Car Truck Co. 41
Bethlehem Steel Company 59
Brill Co., The J. G. 65
Buchanan & Layng Corp. 54
Buda Co., The 59
Byllesby Engineering & Management Corp. 54

C

Cameron Electrical Mfg. Co. 61
Carey Co., The Philip 18-19
Carnegie Steel Co. 45
Chillingworth Mfg. Co. 62
Cincinnati Car Co. 17
Cleveland Fare Box Co. 62
Collier, Inc., Barron G. 38
Columbia Machine Works & M. I. Co. 48
Consolidated Car Fender Co. 62
Consolidated Car Heating Co. 55
Continental Motors Corp. 64
Cummings Car & Coach Co. 21

D

Day & Zimmermann, Inc. 54
Differential Steel Car Co., The 62
Drum & Co., A. L. 54
Duff Mfg. Co. 55
Du Pont de Nemours & Co., Inc., E. I. 27

Page

E

Earll, C. I 48
Eastern Massachusetts St. Ry. Co. 57
Easton Car & Construction Co. 48
Edwards Co., O. M. 34
Electric Equipment Co. 57
Electric Ry. Equipment Co. 56
Electric Service Supplies Co. 9

F

Ford, Bacon & Davis 54
Ford Chain Block Co. 56
"For Sale" Ads 57
Frank, M. K. 57

G

Galef, J. W. 61
General Electric Co. 22, Back Cover
Godwin Co., Inc., W. S. 62
Goodyear Tire & Rubber Co., Inc. 24
Gold Car Heating & Ltg. Co. 62

H

Hale-Kilburn Co. 37
Haskelite Mfg. Corp. 20
"Help Wanted" Ads 57
Hemphill & Wells 54
Heywood-Wakefield Co. 35
Holst Englehard W. 54
Hubbard & Co. 61
Hyman-Michael Co. 57

I

Illinois Motive Equipment Co. 55
Illinois Steel Co. 43
International Register Co. 56
International Steel Tie Co., The 7
Irvington Varnish & Insulator Co. 56

J

Jackson, Walter 54
Jeandron, W. J. 52

Page

K

Kelker, DeLeuw & Co. 54
Kelly-Springfield Tire Co. 28
Kuhlman Car Co. 65

L

LeCarbone Co. 52
Long Mfg. Co., The 33
Lorain Steel Co. 55

M

McClellan & Junkersfeld 54
McGraw-Hill Book Co., The 53
Metal & Thermit Corp. 16
Mica Insulator Co. 52

N

Nachod and United States Signal Co., Inc. 61
National Brake Co. 23
National Pneumatic Co. 15
National Ry. Appliance Co. 59
National Tube Co. 42
Naugle Pole & Tie Co. 61
Nuttall, R. D. 53

O

Ohio Brass Co. 5
Ohmer Fare Register Co. 36
Okonite-Callender Cable Co., Inc., The 61
Okonite Co., The 61

P

Pantasote Co., Inc. 56
Perey Mfg. Co., Inc. 55
Positions Wanted and Vacant 57

R

Railway Track-work Co. 4
Railway Utility Co. 55
Ramapo Ajax Corp. 62
Richey, Albert S. 54
Roebling's Sons Co., John A. 61
Russell Burdsall & Ward Bolt & Nut Co. 46

Page

S

Samson Cordage Works 61
Sanderson & Porter 54
Searchlight Section 57
Smith Heater Co., Peter 62
Standard Steel Works Co. 39
Star Brass Works, The 62
Stevens & Wood, Inc. 54
Stone & Webster 54
Stucki Co., A. 62
Studebaker Corp. of America, The 25

T

Texas Company, The 40
Timken-Detroit Axle Co., The 26
Tool Steel Gear & Pinion Co., The 59

U

Una Welding & Bonding Co. 55
Union Switch & Signal Co. 8
Universal Lubricating Co., The 55

V

Van Loan Corp., Irving S. 57

W

"Want" Ads 57
Wason Mfg. Co. 65
West Coast Lumber Bureau 44
Westinghouse Elec. & Mfg. Co. 2
Westinghouse Traction Brake Co. 10
Wharton, Wm., Jr. & Co., Inc. 59
"What and Where to Buy," 58, 60, 63
Wheel Truing Brake Shoe Co. 62
White Eng. Corp., The J. G. 54
Wish Service, The P. Edw. 55
Wood Co., Chas. N. 61

Y

Yellow Truck & Coach Mfg. Co., Insert 11-12-13-14

WHAT AND WHERE TO BUY—Continued from page 60

Switches, Tee Rail
Ramapo Ajax Corp.

Switches, Track (See Track Special Work)

Tampers, Tie
Railway Track-work Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail Special Track Work
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Carnegie Steel Co.
Godwin Co., Inc., W. S.
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Ties, Wood Cross (See Poles, Ties, Posts, etc.)

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Okonite-Callender Cable Co., Inc.
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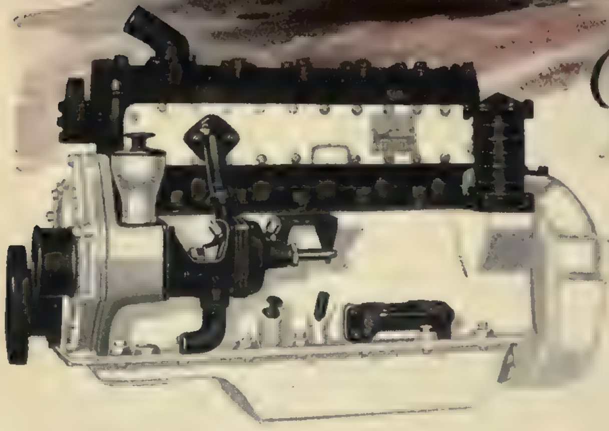

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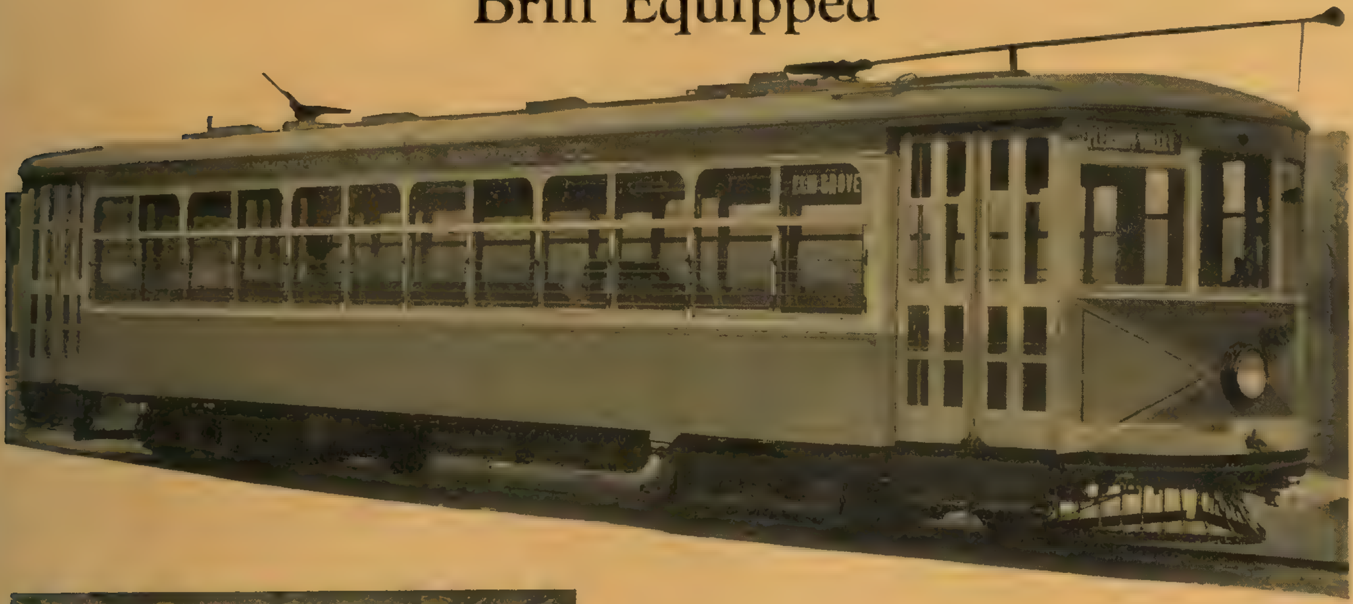

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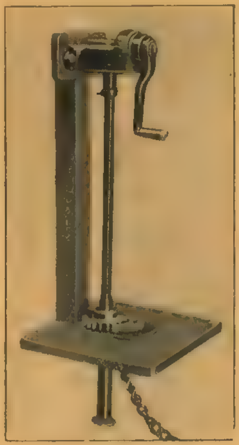

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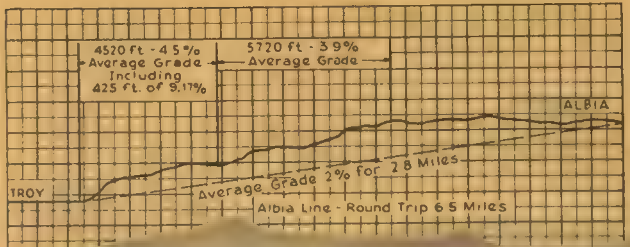

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Vol. 69
No. 7

Pages
273-316

CONTENTS

FEBRUARY 12, 1927

Editorials 273

Our Primary Interest Lies in the Upbuilding of Our Communities 276

BY W. H. SAWYER.

Greater co-operation is needed within the industry. Transportation will prosper and progress only as it plays a proper part in civic development. Better facilities and service at adequate rates of fare benefit both the transportation companies and the communities they serve.

Buses Meet Severe Operating Conditions in Albany and Troy 279

Experience with successive types of buses prove the adaptability of the six-cylinder gas-electric type for frequent stop service and heavy grades.

Co-ordinated Study of Rail Corrugation Made in Europe 281

BY D. D. EWING.

International Union committee believes rail quality and track condition are important factors. Influence of rolling stock is now being investigated.

No-Parking Areas Established Opposite Railway Curves 282

Effect of Abrasion and Compression on Rail Corrugation 283

BY CH. FREMONT.

Energy stored by elastic deformation of the axle cause de-torsion and consequent abrasion. Compression causes structural changes in the rail.

Chicago Builds an Improved Snow Plow 286

BY W. C. WHEELER.

Double-truck unit built in shops of the Chicago Surface Lines is arranged for double-end operation and carries a central shear at 45 deg. under each end. Two wings clear the side area. All four shears are operated by compressed air.

New Bus and Truck Repair Shop for the Los Angeles Railway 288

The Readers' Forum 289

Maintenance Notes 292

Association News and Discussions 295

Optimism Pervades C.E.R.A. Meeting 295

Financial Reorganization Saved the Original Investment 296

BY ROBERT N. FEUSTEL.

Congestion Relief with de Luxe Coaches 298

BY T. W. NOONAN.

Why Exhibit Steel Cars at Cleveland? 299

BY M. B. LAMBERT.

Increasing Speed and Comfort by Modernization of Equipment 300

BY E. A. PALMER.

American Association News 301

News of the Industry 303

Of the Industry *By* the Industry

WITH the hatred and bitterness of a fratricidal war but a dim memory, the country is united in its opinion of the worth of Abraham Lincoln. Scarcely a day passes but what some political, economical, or social doctrine of this great man finds its way into the public print. To many of us, his greatest utterance was made in the latter part of the Gettysburg Address when he said: "—Government of the people, by the people, for the people." Here he laid down in a few words the salvation of those who would maintain a republic of freedom and progress, rooted in charity, courage and vision.

To the extent that is within its power, ELECTRIC RAILWAY JOURNAL has tried to apply the Great Emancipator's maxim in its relation to the printed word designed for a specific field. Upon this basis it is striving to produce a journal of the industry, by the industry, for the industry, in order that the industry may not perish from the earth, and, as the republic, may aspire to a sphere of greater development and usefulness.

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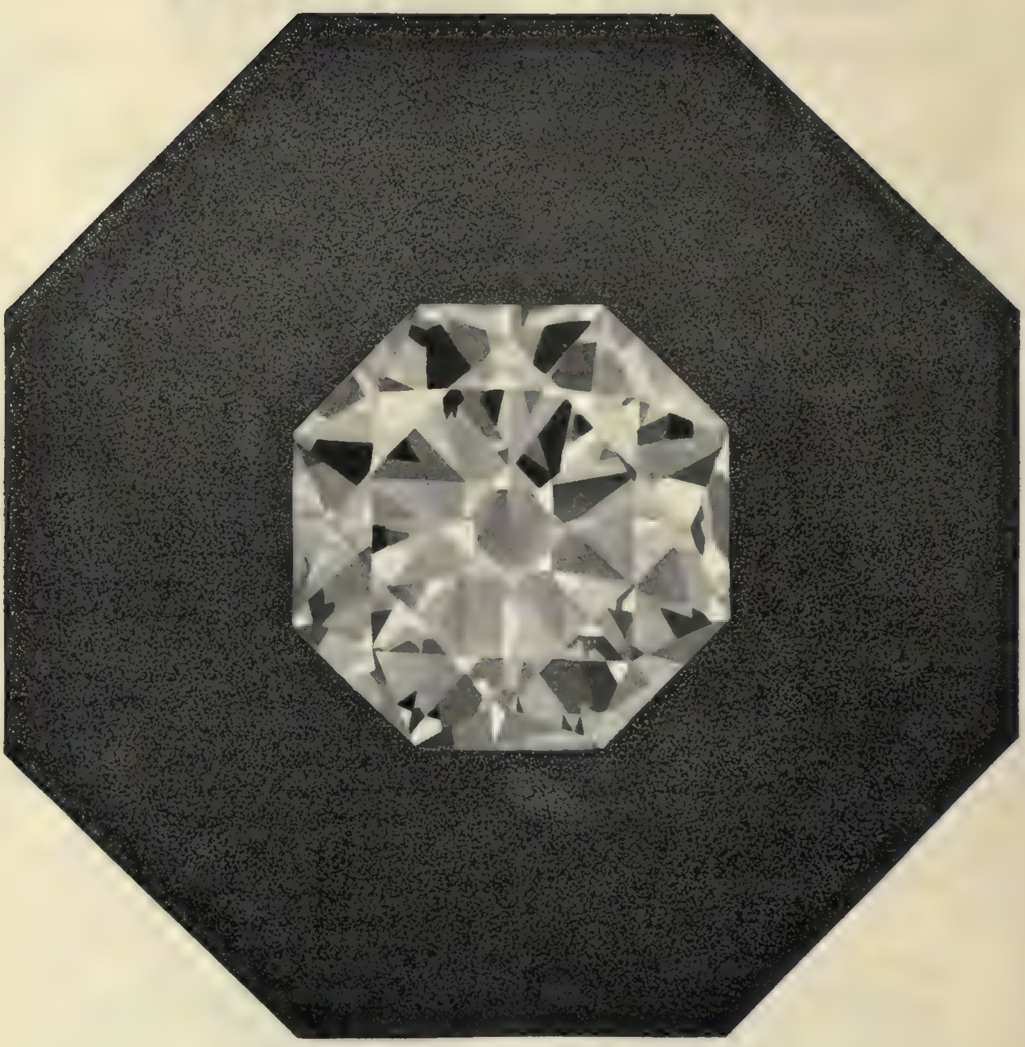

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BESIDES the great beauty which distinguishes the diamond is a unique usefulness in industry. An unexcelled hardness that fits it peculiarly well for difficult cutting work is inherent in the diamond. Nothing takes its place.

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AMERICAN STEEL FOUNDRIES

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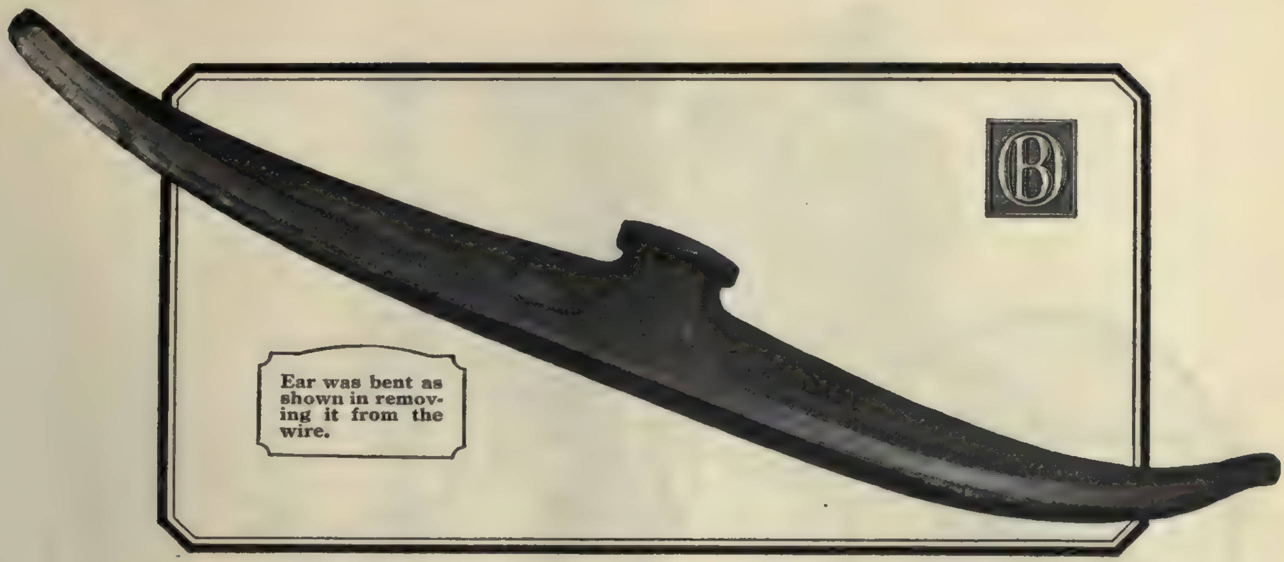

Ear was bent as shown in removing it from the wire.

"There Ain't Any Such Animal"

THE RUSTIC who made that famous remark on seeing a giraffe on his first visit to the circus has nothing on a lot of electric railway men who will read this Marathon Ear record.

Who ever heard of a trolley ear that stood the gaff of 701,478 car passes? "There ain't any such animule." Yet that is exactly what you see pictured herewith, just as it was received by us from a street railway company in New England. (Name furnished if desired.)

701,478 car passes may seem an impossible record of service for a trolley ear. Ordinary ears wear out after only a fraction of that number of car passes. And even for a Marathon Ear it is not an every day record. Other Marathons on the same property averaged only 541,544 car passes.

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The Famous O-B Marathon Ear

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Ohio Brass Co.

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Making each passenger his own brakeman!

Confer with our representative regarding the desirability of Westinghouse Variable Load Brakes for *your* new cars.

Each passenger boarding a car adds more weight to be controlled by the brakes.

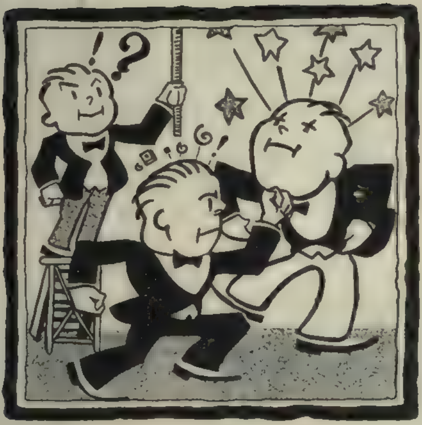
If the ordinary air brake equipment is used, this additional weight will result in a longer stopping distance than when the car was empty—particularly if the car is of the modern light weight type. The longer stop reduces the schedule speed and slows up transportation service for the passenger.

If Westinghouse Variable Load Brakes are used, however, the weight added by each passenger entering the car does not remain uncontrolled, but is used to automatically adjust the brake mechanism so that a corresponding increase in retarding force is made to assure the same stopping distance as before his extra weight was added. Each passenger thus unknowingly helps to safeguard and expedite his journey.

This modern brake for modern cars makes for safer and faster transportation, because uniformly short stopping distances are assured by virtue of automatic adjustment of brake cylinder pressure as the passenger load changes.

WESTINGHOUSE TRACTION BRAKE CO.
General Office and Works, WILMERDING, PA.

WESTINGHOUSE TRACTION BRAKES



How high is up?

There was a time when people used to bait one another with such exploitation - We haven't heard whether the matter was ever settled.

And in the electric railway field there has been considerable discussion on the matter of paved track construction—whether the construction should be *rigid* or *flexible.*

The controversial nature of the discussion of various types of paved track construction and the lack of comparative data has led to certain indefiniteness of statement—amounting, in some cases, to inaccuracy.

The engineers of the International Steel Tie Company have worked out a scale of comparison ranging from *extreme flexibility* (open track-wood tie) to *extreme rigidity* (slot construction—underground trolley) that will eliminate confusion of these terms.

The task of building the best paved track for electric railway use is only partly accomplished after the selection or designing of the tie. It remains to adapt the tie to the rest of the structure.

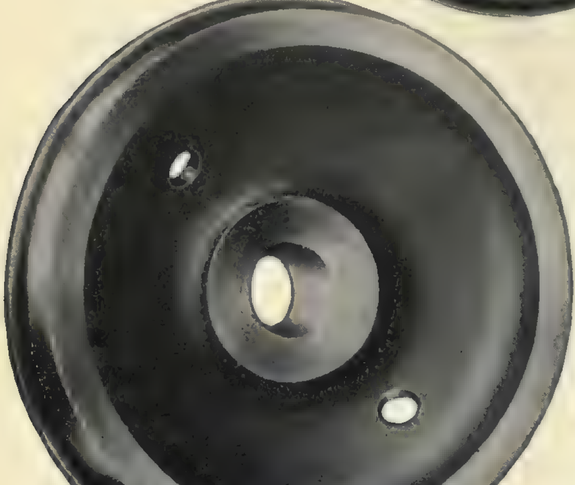
The adjustment of the tie to the rest of the track structure depends on factors often overlooked, i.e., the coefficient of expansion and contraction of *all* the materials entering into the structure—again the comparative normal life of those same materials.

This data is included in our new Paved Track Notebook. Engineers and executives should be sure to have this book—If you haven't received your copy, be sure to send for it.

The International Steel Tie Co.
Cleveland, Ohio

20% more bearing surface
steel Twin Tie track

The illustration above shows the Cambria Wheel Plant of Bethlehem Steel Company at Johnstown, Pa. Cambria forged axles are also made at Johnstown.



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Even at a distance clear, clean, legible billboards are easily read. The important points stand right out.

And likewise the important destinations and routes of a car or bus should be quickly readable at a glance even at some distance.

To use Hunter-Keystone Signs on cars and Hunter Signs on buses is "To tell the public where you're going." The bold white letters on black roller curtains give high visibility by day or by night.

Let us send you a copy of Catalog No. 7. It completely describes and illustrates the full line of Keystone Car Equipment. Catalog No. 9 covers Bus Equipment.

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Modern types of cars are as varied as the communities they serve. Single truck, double-truck—single end, double end—all have their place in handling the peculiar problems within their zones of operation. High cars, low cars—long cars, short cars—but all Safety Cars where the best interests of a community and a will to serve vividly and economically are given thought.

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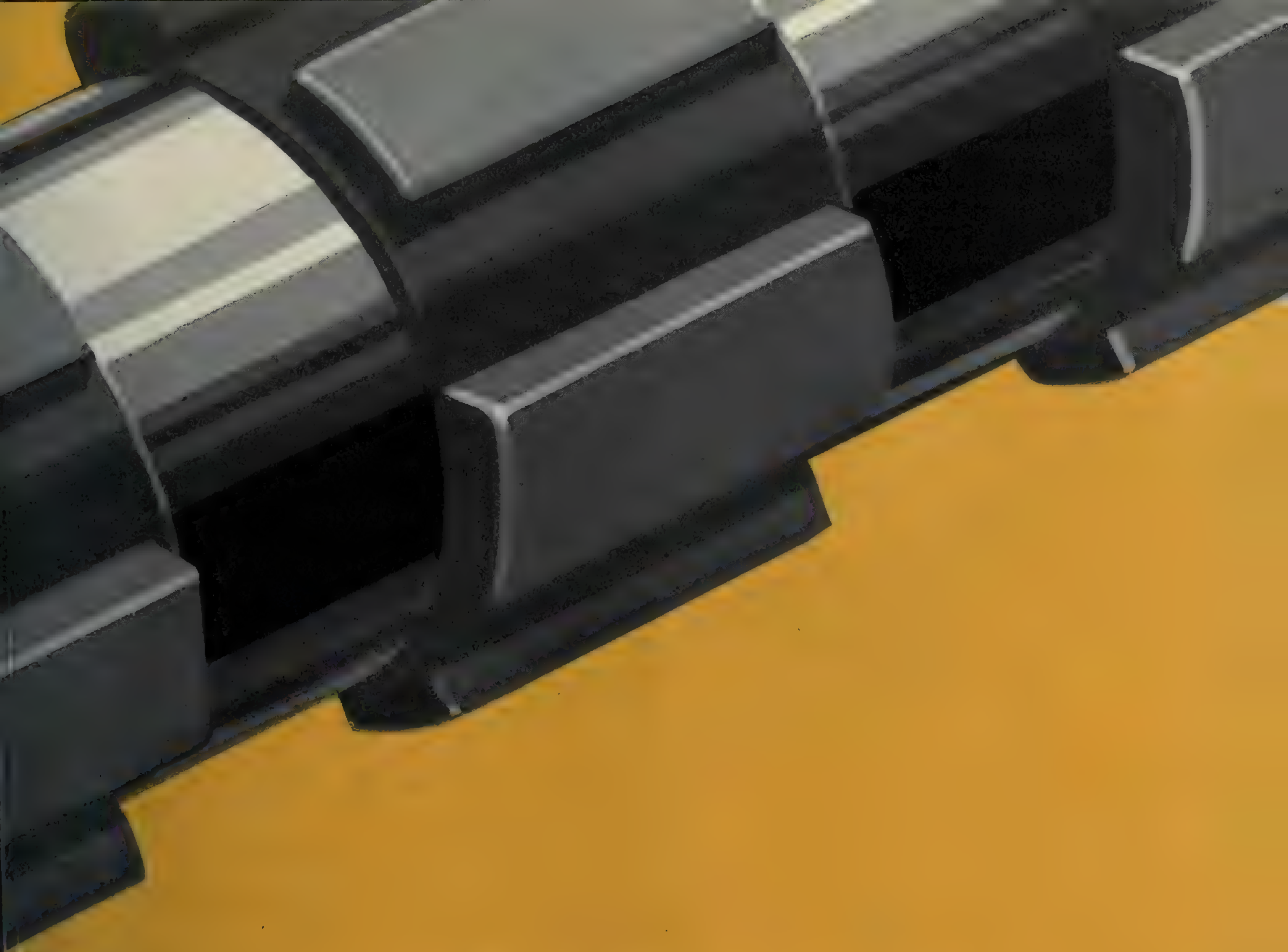
It is a Safety Car if equipped with our standard Safety Car Control Devices

So Easy to Shift

Quietness in transmission gears and ease of shifting are usually incompatible.

They are not to be attained by ordinary means—but Mack does it.



Extraordinary design and superlative quality are required to combine the silent efficiency of truly meshed gears with the smooth, easy engagement that saves not only seconds but drivers' nerves in shifting.

Mack solved a hitherto unsolved problem by inventing the interrupted splineshaft and establishing new standards of precision production.

By separating the splines into sections divided by raised guiding lands, ground to true size and roundness, Mack for the first time provided a large-area, true ground surface to guide the ground hub bores of the gears.

The splines do nothing but drive. The lands do all the guiding. No undercuts weaken the shaft. The gears slip freely along the bright, even surfaces, yet are so precisely fitted that they are bound to run true and silently.

The Third Avenue Railway System of New York City Uses Both Four and Six Cylinder Mack Buses

You can't see its goodness—but it's there

Bright paint and nickel plate don't make quality. You must look deeper.

Under Mack's painted surface are the finest steels—fabricated as no one else does. Steels and other fine materials finely wrought. Long after the paint is gone they endure for hundreds of thousands of profitable revenue miles. Then—after years of low cost, trouble-free service—owners know just what Mack Quality service means—and why it is worth-while.

That is why, in one instance, an operator reports that his Macks were off the route for mechanical servicing just one hour every 266 miles. The next best record of any other make of bus in his fleet lost its hour every 65 miles.

He says—as does The Third Avenue Railway System (N.Y.)—that Mack Quality pays. Mack's exclusive design, as shown in the interrupted spline shaft in the transmission, quiet and enduring, does its part in establishing such records.

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International Motor Company
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SPEED – SAFETY – COMFORT

National Pneumatic Door and Step Equipment makes every car a ***faster*** car, a ***safer*** car and a more ***comfortable*** car. Probably no other single item of equipment contributes to all three of these objectives in so many different ways.

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Railway & Power Engineering Corp., Ltd.

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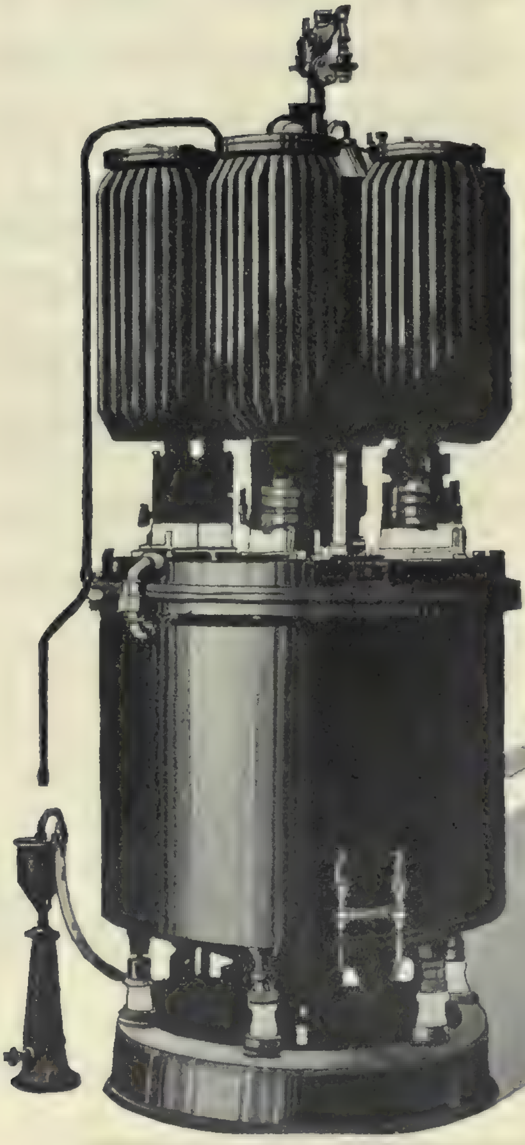
ABB

American BROWN BOVERI

Revenue is revenue— dropped in the fare-box or saved in the substation



THE chart tells the story.

The $730 saved annually by one Mercury-Arc Power Rectifier as checked against a rotary converter is equal to 14,600 five-cent passenger fares.

Resulting revenue is just as profitable whether it comes in through the fare-box or the substation.

Chief Advantages

(1) Efficiency high over the whole working range.

(2) Simple operation and minimum attention.

(3) No synchronizing.

(4) Very high momentary overload capacity and insensibility to short circuits.

(5) Negligible maintenance.

(6) Low weight. No special foundations.

(7) Noiseless and vibrationless operation, consequently rectifier substations can be erected in densely populated localities.

(8) New substations need only be of light construction. In many cases old houses can be converted, while the plant can often be erected in places that could not be considered for rotating machinery.

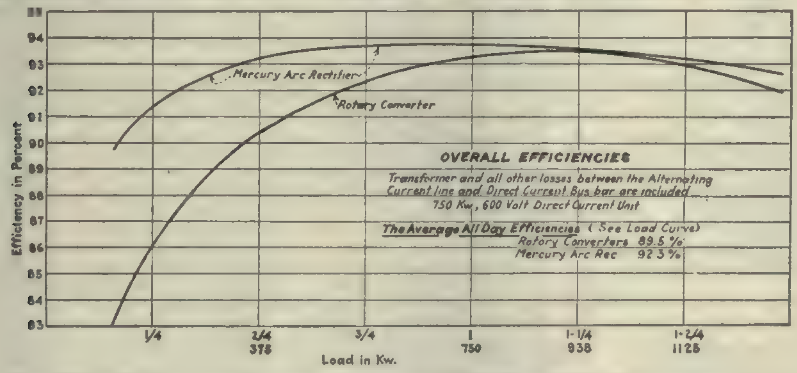
Mercury-Arc Power Rectifiers

With a BROWN BOVERI MERCURY ARC RECTIFIER, characterized by unusually high efficiency at partial loads, the Average Converting Losses are, at extremely Low Load Factor, *cut down tremendously,* even at Rail Voltages as low as 600 V.

Below is shown what can be done in an Actual Case by the use of Mercury Arc Rectifiers. The reference is to an Interurban Railroad in one of the Eastern States. The substation rating is 750 Kw.-H., 600 V. The part of a record roll reproduced on this page shows the usual output over a period of six hours.

The AVERAGE ALL DAY OVERALL EFFICIENCY was found to be:

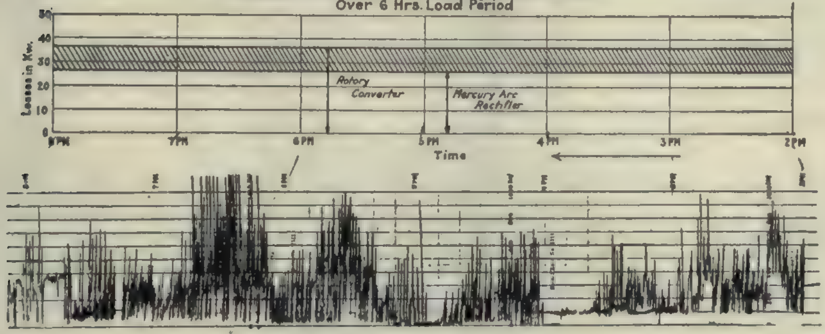
for Rotary Converters.............. 89.5%
for Mercury Arc Rectifiers.......... 92.3%



The saving obtained in six hours (represented by the shaded area) when extended over a 20-hr. day, amounts to MORE THAN 200 KW.-H., or, at 1c. per Kw.-H., THE ANNUAL SAVING effected is $730.00, which is the INTEREST on MORE THAN $10,000.00.

In addition to the power saving, the maintenance cost will be less than half as much as with rotary converters.

Comparative Average Converting Losses in Kw.
Over 6 Hrs. Load Period



American Brown Boveri Electric Corporation

165 Broadway, New York, N. Y. Camden, New Jersey
922 Witherspoon Bldg., Philadelphia. 842 Summer St., Boston 230 South Clark St., Chicago.

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA 1927

AMERICAN BROWN BOVERI

LONG LIFE

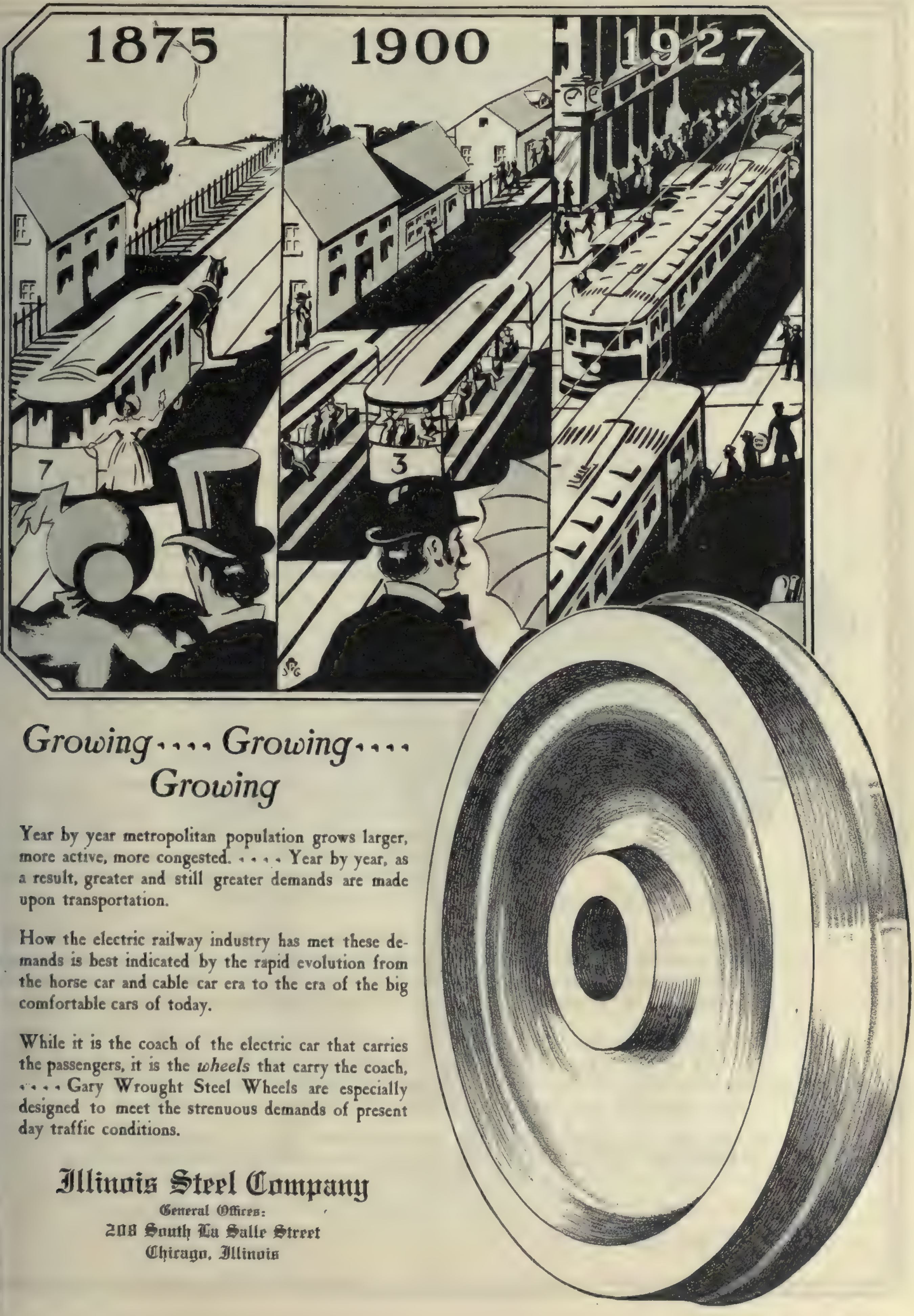
ECONOMY BEGINS as soon as *International* poles go in. Their remarkable durability assures long life, low annual cost and added years of reliable service. Leading public utility organizations attribute a life of more than 25 years to Creosoted Pine—and know that the service the year round is dependable and economical.

International stands for the best in timber preservation—sound timber, correct seasoning and scientific treatment under rigid chemical control. *International* has had poles in service more than 25 years and their condition indicates they are good for many more years.

International Creosoting & Construction Co.
Galveston—Texarkana—Beaumont

The illustration shows International poles in service of the Southern Colorado Power Co. between Pueblo and Canon City.

International
Creosoted Yellow Pine Poles



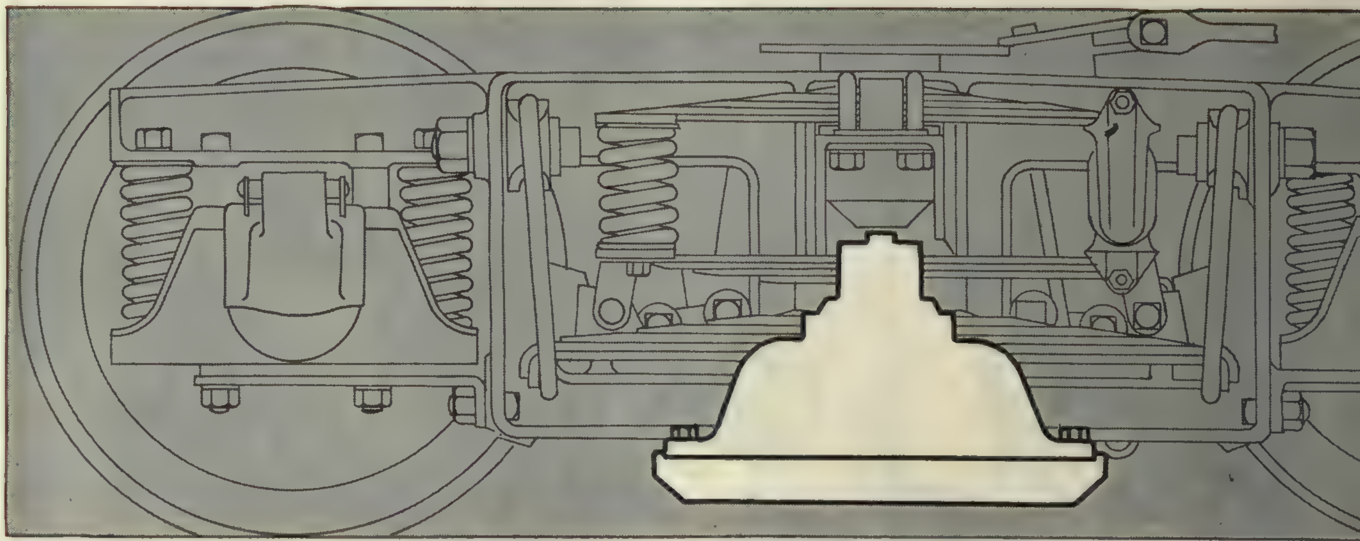
Growing . . . . Growing . . . .
Growing

Year by year metropolitan population grows larger, more active, more congested. . . . . Year by year, as a result, greater and still greater demands are made upon transportation.

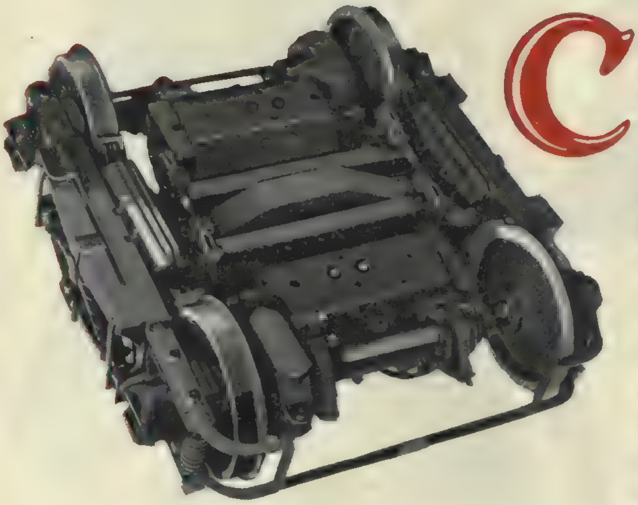
How the electric railway industry has met these demands is best indicated by the rapid evolution from the horse car and cable car era to the era of the big comfortable cars of today.

While it is the coach of the electric car that carries the passengers, it is the *wheels* that carry the coach, ... Gary Wrought Steel Wheels are especially designed to meet the strenuous demands of present day traffic conditions.

Illinois Steel Company
General Offices:
208 South La Salle Street
Chicago, Illinois



The Magnetic Brake—*as*



CINCINNATI BALANCED DESIGN has effected the first practical application of the Duplex Air and Magnetic Brake.

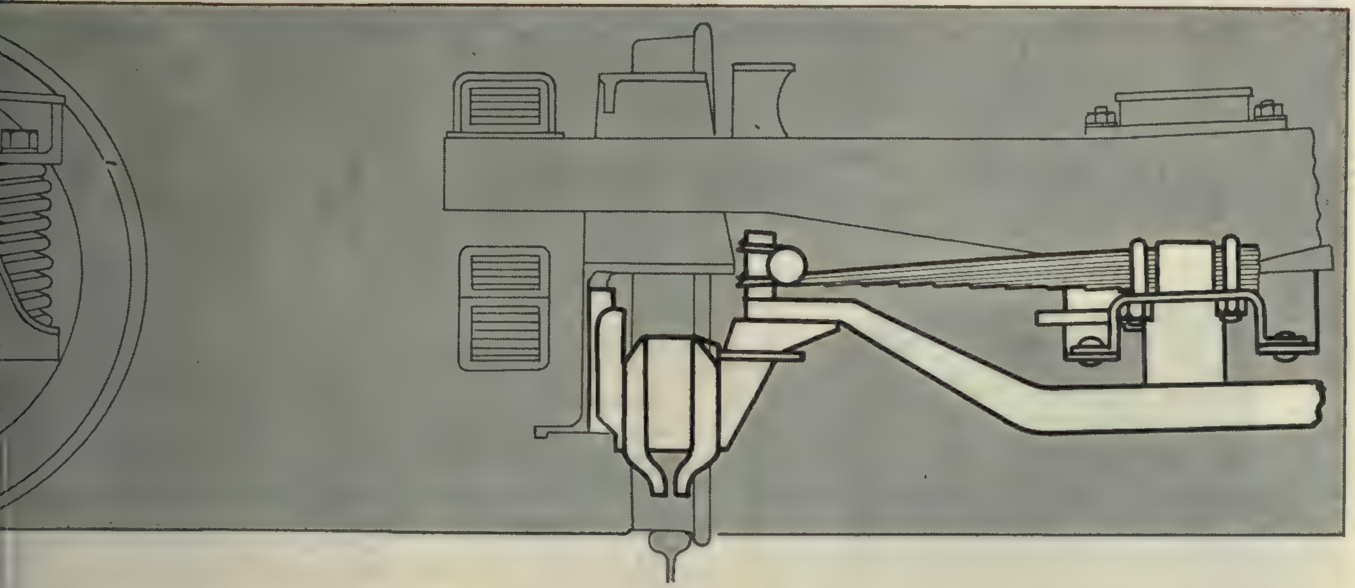
It has taken the basic units which proved so successful at the trials held on the Buffalo & Erie Railroad last summer, and incorporated them in a unique high-speed truck, accurately balanced to meet the needs of today.

Blue prints and photographs of the new truck are reproduced on this page. Note the mounting of the magnetic brake shoes *within* the cast steel side frames. Note also the arrangement of the spring rigging, to provide for the additional brake equipment and also to assure great stability of the light-weight car at speeds up to 60 mph.

An important feature of the magnetic brake as now used lies in the fact that the shoe is maintained *well above* the rails, being forced down by air pressure only during the time application is made. Thus the need for adjustment and careful rail maintenance, so necessary with earlier types of this equipment, is no longer present.

The Duplex Air and Magnetic System utilizes the standard method of brake operation with an M 28 Valve, the sander connection being used to operate the magnetic brake shoe circuits *automatically* when the brake valve is thrown to emergency. This arrangement also permits of independent operation if desired.

The Duplex Air & Magnetic Brake is presented as a part of Cincinnati BALANCED car DESIGN only after practical tests have proved its efficiency beyond doubt. The electric railways today are looking for equipment which will enable them to give faster and safer service, with utmost comfort. Certainly a braking system which

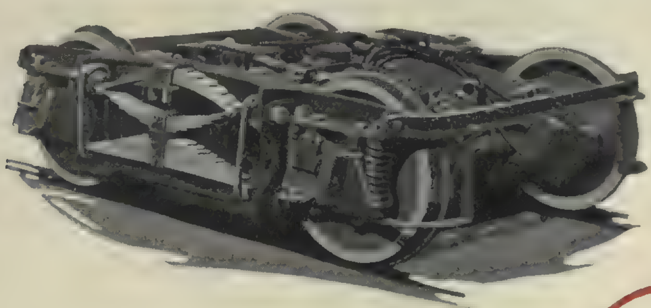


feature of BALANCED DESIGN

reduces emergency stopping distance 22.5 to 46% can be utilized to these ends, . . . especially when built into trucks and cars accurately BALANCED to make the most of its possibilities.

We will be glad to send further data to any interested electric railway executive.

CINCINNATI CAR COMPANY, CINCINNATI, OHIO



CINCINNATI *New* CARS

~A step ahead of the modern trend

A Who's Who—
# of G-E Carbon Brush Users

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- Brooklyn Manhattan Transit Corp.
- Connecticut Company
- Georgia Railway & Power Company
- Hudson & Manhattan Ry.
- Key System Transit Co.
- Market Street Railway
- Milwaukee Electric Railway & Light Co.
- New Haven and Shore Line Railway Co,
- New Orleans Public Service Co., Inc.
- New York Central Railroad
- New York & Stamford Railway Co.
- Schenectady Railway Co.
- United Traction Company

These regular users of G-E Carbon Brushes are among the many properties that have found them an important help to the continuously dependable operation of railway motors.

Satisfied users are the best advertisers of any product. Like all other General Electric equipment, G-E Carbon Brushes have behind them the resources and engineering facilities accumulated during 30 years of manufacturing experience.

For
Original Equipment Quality

330-36

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

Volume 69 New York, Saturday, February 12, 1927 *Number 7*

Why Not Call It Popular Transportation?

IN DISCUSSING the transportation of people to and from their homes and places of business, the term "mass transportation" has come to be generally used. Unfortunately this is an apt description of transportation standards forced by the rates of fare permitted in most American cities. People are moved as masses instead of as individuals, and the standards usually applied to the treatment of the individual have been completely abandoned in the continued effort to move humanity in the bulk at the lowest possible cost.

Hope for the future lies in a gradual awakening on the part of the public and a demand for something better in transportation at an appropriate price. But even under existing conditions, the common use of the word "mass" is an unhealthy influence. Why not substitute "popular"? We use this word generally when referring to the price of a service or commodity which is in the reach of everybody. "Popular transportation" seems more appropriate and tends to create a slightly improved conception of the job we are trying to do than does "mass transportation."

Hysteresis Is Characteristic of Many Electric Railways

STUDENTS of physics are familiar with the phenomenon of lag in electro-magnetism, known technically as hysteresis. In a different form this lagging tendency seems to afflict a considerable number of electric railways. They are just now starting to do what the leaders of the industry did several years ago. They have not yet begun even to think about the things the progressive companies accomplished during the past twelve months. Two or three years from now, if all goes well, they may consider the adoption of these improvements.

For example, the management of a certain railway recently decided that money could be saved by the use of a simplified scheme of exterior decoration on its cars —a one-color background instead of the former two-color arrangement, with less striping and lettering. This policy is completely in accord with the general thinking of the electric railway industry several years ago, but apparently disregards the recent change in outlook. Today the best thought of progressive managements is being devoted to increasing the attractiveness of the cars rather than to saving money in painting. Steam railroads and electric railways are pursuing similar policies. Cars and locomotives are being painted in distinctive designs. Dull, drab colors are being abandoned in favor of bright, cheerful hues. At Saginaw and Grand Rapids the local railways have gone so far as to vary the scheme of decoration on individual cars. To give rolling stock an attractive appearance it is not necessary to spend large sums. For a little more than the minimum, if the money is judiciously used, a pleasing effect can be obtained. Those who have done this find it pays well.

The chief sufferers from the more or less prevalent tendency to lag behind the times are the companies following the policy. To some extent, however, the effect extends beyond them and hurts the standing of the industry as a whole. While it may be a safe policy to adopt no improvements until they have been tried out for several years by others, such a course shows lack of the kind of courage which leads to success.

Syracuse Goes to a New Fare Schedule

CASH fares on the New York State Railways in Syracuse are to be raised from 7 cents to 10 cents. Ten tickets will be sold for 75 cents. In so deciding the Public Service Commission has ruled on a case that has been before it for some months. As the commission sees it the company exhausted every reasonable expedient in endeavoring to effect economies so as to continue operations at the rates fixed by the commission in 1921.

There was no formal fixation of valuation, but the commission ruled that the rates asked by the petitioner would in no event be unreasonable. It estimates the increased revenue due to the increase in fare at $346,023, based on the figures for the year ended Sept. 30, 1925. This estimate took into consideration the possibility of a 2 per cent decrease in the number of car riders due to the change in the fare schedule. There is no note of censure in the comments of the commission in rendering its decision, but the chairman refers to the complex and involved corporate consolidations which culminated in the formation of the present company. This matter is not easy to follow in its ramifications. It is apparently a case in which the recent recommendations of the A.E.R.A. committee on finance might well be heeded.

Fares have been changed a number of times in Syracuse since 1918. Prior to Nov. 26 of that year the fare was 5 cents. It was then increased by the Public Service Commission to 6 cents and in 1921 it was made 8 cents with four tickets for 29 cents and children's fare of 4 cents. On application of the city the fare was reduced on Oct. 1, 1922, to 7 cents. The commission says that the earnings now represent less than a 4 per cent return and that the new rate authorized is likely to return considerably less than 8 per cent.

The opinion of the commission may well be perused with profit by managers elsewhere, but the principal interest in the decision would appear to lie in the fact that the case represents an apparently sincere effort of a company operating 98 miles of line in a city of 170,000 population to make its lines self-supporting under the economic conditions changed materially from those which prevailed as recently as 1918. There is no question about the right of the company to a fair return upon the value of its property dedicated to public use, but it will be interesting, in view of previous fare changes in Syracuse, to follow the course of earnings under the new scale.

Cutting the Cloth Too Close Produces a Dissatisfied Customer

EXCESS service—cars too lightly loaded—is properly considered a sign of inefficient railway management under ordinary circumstances. To correct such a condition schedules are trimmed. That, however, is a job for an expert and evidence is not lacking that some railways employ unskilled cutters.

For example, take the case of a railway which some time ago lengthened its Sunday headways on certain lines. Every car now carries a small standing load. That may be a source of gratification to a management hard pressed to make both ends meet, but it is a source of much annoyance to the passengers. In the end it will surely prove to have been poor economy.

Probably every passenger who has to stand spends his time thinking dark thoughts about that railway. Next time he goes out on Sunday, he says to himself he will use some other means of transportation. If he carries out this resolve, and very often he does, he may be lost permanently as a railway patron. In any event he is a dissatisfied customer and an easy convert to the doctrines of the demagogues who rant against the traction interests.

In general, the public understands that in rush hours electric railways cannot be expected to provide a seat for every passenger. Those who do not have to travel at such hours have the choice of putting up with the crowding or travel at some other time. Those who must, continue to ride despite crowding. In the middle of the day and on Sundays and holidays, on the other hand, there is little excuse for making passengers stand. At such times the railway patrons ride from choice rather than necessity. Unless the service is reasonably frequent and comfortable, they will be discouraged from riding. The money saved by cutting schedules will go to pay the high cost of short rush-hour peaks, and the last state of that railway will be worse than the first.

Adopting the Manner When the Spirit Is Lacking

COURTESY, co-operation and like actions which depend for their effectiveness on the personality of the individual are keynotes of policy in the transportation industry today. To some men politeness and helpfulness come naturally; to others they do not. Yet it is imperative that the public be treated with courtesy at all times—not merely when dealing with a man who is polite by nature. It behooves the management of a transportation company, therefore, to devise means of inculcating a spirit of courtesy and co-operation in all its employees.

Where and how to begin is a problem. Speaking particularly on "co-operation" at a recent meeting of the Metropolitan Section, American Electric Railway Association, G. T. Geer, secretary of the Third Avenue Railway, New York City, suggested the adoption of the proper manner, even when the real spirit is lacking. Going through the motions of co-operation or being courteous gets to be a habit, he said, and in time begets a sincere desire to co-operate and to be courteous. Undoubtedly there is a good deal of truth in this theory, and it furnishes a tangible starting point for training. If a man who is otherwise a valuable employee lacks a naturally courteous manner, he can at least be taught to adopt its outward form. Later, it is to be hoped, he will catch the genuine spirit.

Danger lurks in this plan, however, as it is possible that the man's development may stop with the mere adoption of the outward form. Courtesy that is only skin deep is little better than none. As a beginning, it may be said to be a step in the right direction. But before it really can count for much it must come from the heart.

Service at Cost— or at Less than Cost

ENLIGHTENING in that they illustrate the wide range of thought possible on the economics of service at cost are two communications published elsewhere in this issue. They followed from an article in a St. Louis newspaper purporting to be an interview with delegates attending a convention of some seven economic societies meeting in that city early last month. Unfortunately the article presented only the views of those apparently antagonistic to the theory on which is based the franchise now being negotiated between the city and interests attempting to reorganize the United Railways of St. Louis. Diametrically opposed views from equally capable economists were omitted.

In his communication Prof. James C. Bonbright of Columbia University corrects certain misstatements in the newspaper article and then advances a theory that a contract once entered into relative to the rates for service must survive, even though one of the contracting parties be financially wrecked. From the arguments advanced by him it would appear that the cars and rails of the system were in some peculiar manner a party to the contract, rather than the corporation owning the physical plant. Many of the present troubles of electric railways are due to politicians holding the same view.

On this theory, the greater portion of the investment would cease to have any value in case a contract proved unprofitable. It is not sound economics to insist on the last pound of flesh in requiring the fulfillment of a contract which common sense shows cannot be carried out. The successful issue of both mortgage bonds and stocks depends on earning power over a period of years, and this is subject to changing conditions that cannot be prognosticated accurately long in advance. But to attract capital and provide a satisfactory service rates must be such as to give an adequate return on the money prudently invested in the enterprise. On Professor Bonbright's theory the purchaser of either bond or stock must for his own protection demand a higher margin of safety or a larger rate of return lest the fixed rates prove unprofitable and destroy the earning power. It is on a basis such as this that he believes a cost-of-reproduction valuation is too high on general principles.

L. R. Nash, on the other hand, contends that both the city and the company entering into a contractual relation bear definite responsibilities. The company renders a service that the community wants. If the community is not willing to bear its share of the cost of service, then "what it seeks is not service at cost, but service at less than cost."

That regulated utilities must be permitted to earn adequate returns in exchange for good service is a principle so generally accepted today that expressions of opinion such as that typified by the Bonbright letter, similar in many respects to the opinions of Prof. Robert Hale and John Bauer, who also contributed to the St. Louis newspaper article, seem to savor more of miraculously attempting to extract the "pound of flesh" than of expounding real economic theories.

Aside from the ill effect on a community arising from the expressed views of economists such as those gentlemen visiting in St. Louis, it is alarming to realize that the young men of our colleges, studying the rudiments of business, may be exposed to such unsound theories that cannot stand the acid test of practice. Such views are not in accord with the preponderance of evidence evolved from successful business methods, and they run counter to the many Supreme Court decisions that have been the milestones that have guided the industrial growth of our nation.

Car Replacement Awaits Manufacturer Initiative

GROWING interest in the improvement of equipment is evident throughout the electric railway industry. Better appearance, reduced noise, more comfortable seating, streamline painting, use of floor coverings, easier riding trucks and other elements which add to the attractiveness of an electric railway ride are being actively discussed by operators both individually and in committees. The general tendency to experiment with the rebuilding of old cars is merely another indication of the widespread conviction that car improvement is an essential and necessary requirement of the industry.

In many cases, unwise expenditures are being made for rebuilding old and heavy equipment, when the difference in cost for new cars could be financed out of the savings which new cars would make in operating and maintenance costs. But in the very fact that so many old cars are being rebuilt there is a challenge to the ingenuity, courage and business foresight of the car builders. Electric railways are genuinely interested in the advantages of improved equipment. In many cases, however, the advantages of new equipment are not sufficiently evident to overcome the attachment which some properties seem to have for their old cars. In some respects this hesitation is justified by the fact that manufacturers have failed to foresee the need of the times or adequately to interpret this in the development of their product.

The days of just building cars to meet the ideas of the customer are going rapidly. The customer has ideas, of course, but in the past the car builder has dodged the full responsibility of a manufacturer by merely operating as a contractor to build according to the customer's ideas. The plea in defense of this practice has been that the customer insisted on having his own way. That may all well be true, but there is ample basis for concluding also that the manufacturer has not been reluctant to yield to the customer's views, even when he knew better, as a means of dodging the responsibility which every producer should assume as to the performance of his product and its suitability for a particular service.

Discussion of this subject with many operators who have had the reputation of insisting on their own designs shows no widespread belief in the wisdom of this practice. The usual view expressed is that the manufacturer has had little to offer, except possibly a design developed by some other railway property, and that consequently the operator has had no choice but to accept another operator's design or to specify his own. In some cases, railways which have been in the habit of building their own equipment point out that they do not believe in this practice as a sound business policy, but have built their own cars because the manufacturers had nothing better to offer.

Doubtless there are things to be said in defense of the car builder's viewpoint. The subject is a critical one to the industry and is deserving of the fullest and frankest discussion. The foregoing is not intended as a full analysis of the situation from both sides. It presents primarily the railway viewpoint. But the responsibility for bringing about improvement in car building and car merchandising practice rests with the manufacturer. The present widespread tendency for railways to spend money in rebuilding heavy, awkward cars is a challenge to the advantages of new equipment. It is up to the manufacturers of the industry to push ahead with such a program of car design improvement, that the advantages of replacement instead of rebuilding will be evident to even the most precedent-bound executive.

Co-operation with Police Means More than Mere Friendliness

JUSTIFICATION often is lacking for the claim that a fine spirit of co-operation exists between the local police department and the operating personnel of the street railway. Actions, rather than words, are the true evidence of a desire to be mutually helpful. Traffic officers and platform employees may outwardly be on a very friendly basis, without the existence of any real co-operation.

As far as it goes, it is a fine thing for the police commissioner to be on good terms with the general manager of the railway; to sit in his office, smoke his cigars and talk over the traffic problems. Similarly it is a fine thing for Bill, the motorman, and Jim, the traffic officer, to exchange pleasant greetings at the beginning of their day's work. But this friendliness, if it stops there, really fails to facilitate the movement of street cars or other vehicles.

At a busy intersection the expeditious handling of traffic depends largely on the skill of the individual policeman on duty. Automatic signals have not eliminated his influence. Establishment of traffic regulations is beyond his control, but enforcement of them is equally important, and in that he stands supreme. Whether a street car crosses at the end of one movement or must wait for the beginning of the next depends on a gesture of the traffic officer. Left-hand turns of vehicles can be so controlled that little interference with other movements is caused, or they may be allowed to block the entire intersection for the time being.

Back of this work of the individual policeman lies the attitude of the department and the municipal authorities. There, too, the need exists for more than a spirit of mere friendliness. Railways do not seek favors, but only fair treatment, based on a true concept of the relative importance of various vehicles in the general transportation scheme. By all means let friendly relations be fostered, but let the matter not stop there. Let the co-operative spirit be transmitted into active co-operation.

Our Primary Interest Lies in the Upbuilding of Our Communities*

Greater Co-operation Is Needed Within the Industry—Transportation Will Prosper and Progress Only as It Plays a Proper Part in Civic Development—Better Facilities and Service at Adequate Rates of Fare Benefit Both the Transportation Companies and the Communities They Serve

By W. H. Sawyer
President American Electric Railway Association

NO ONE can question but that an industry like ours needs and must have a national association. There is no question in my mind but that there is a definite need also for the Central Electric Railway Association. No one at the end of such a meeting as you have had today can doubt this. It has been a real inspirational meeting, and I say, more power to you. You get really closer to your definite local problems than we do in the national association. The stronger you make the Central Electric Railway Association the stronger should be our national association.

I happen to be temporarily—for one year only—the president of the American Electric Railway Association. I have certain definite thoughts as to what might be done to make this association an even stronger organization than it is today. I have asked the proper committees to review all of the activities of this association. Immediately, however, there is a thought to preserve inviolate past practices and traditions. If what is proposed to be changed is wrong, I want it to stand or fall on its merits. I am not content to continue certain practices just because they have been the past procedure. I believe I would not be faithful to my trust if I did not ask for a thorough review and analysis of all the acts and doings of this association. This is a business association, to be operated on business principles, and changes are naturally necessary in any business organization. I do want it thoroughly understood, however, that the discussion of any such changes is purely impersonal. When we get all through with our studies we may make few changes, but at least we will be able to assure the industry that all work of the association is on an effective and economical basis.

OPPORTUNITIES FOR IMPROVEMENT ALWAYS EXIST

It is my belief that by reduction of duplication and by co-ordination of all facilities of the industry, we can have an association which will do better work on a more economical basis. In that thought I may be wrong, but when next October comes around and the American Electric Railway Association goes before the industry for increased dues, I want it to be as nearly as practicable on a co-ordinated, economical and unassailable basis.

Between now and next October the finance committee, the policy committee and the committee on revision of constitution and by-laws will make their reports. It appears now as if all three of these committees would recommend changes. I recognize, as I said before, that I am only temporarily president and that this association is your association. All I am doing is giving advance notice, as it were, that I am one of those who believe we can do a better job than we have been doing. I consider this no criticism of any past official or past action of our association.

All of us on our own properties are looking over our hands and are doing things differently today than we did even one year ago. All I am asking is that we do the same thing with our American Electric Railway Association. On our own properties we sit around the board and discuss changes. We at times differ widely, though honestly. Eventually we come closer to one accord and take a progressive step. That is all I expect in connection with the American Electric Railway Association. I want to have its activities analyzed and discussed openly, freely and frankly, and then let us all be of one accord, working together for the industry which means so much to all of us.

CLEVELAND CONVENTION PROMISES TO SURPASS LAST YEAR

Now, just a word about the Cleveland convention and our friend Colonel Alexander, because I cannot think of one without thinking of the other. The colonel is giving us real co-operation. I have his word for it, and I believe in him when he says that he will give us a street car exhibit far better—both as to quality and quantity—even than the street car exhibit of 1926. Your own Harry Brown has charge of the program and it is to be of the conference-discussion type, rather than set speeches.

Some of you felt that it was a mistake when we came back to Cleveland. I appreciate that Atlantic City is one of the best convention cities, if not the very best, in the world. But Atlantic City this year could offer us practically nothing except the pier, as we had it in 1925, and a temporary building. We could not have held in Atlantic City this year a real street car exhibit, and such an exhibit is at this time, I believe, essential and necessary.

CAR EXHIBIT WAS INSPIRATION

It was an inspiration to me; it was an inspiration to many at Cleveland actually to see all those modern cars, which had been purchased by hard-headed business men who considered them essential in merchandising their service. We had talked a great deal and had read about companies that had been successful in modernizing their equipment, but here we had actual examples before us of what had been accomplished. I do not believe that any man went away from that convention without something closely akin to an inspiration and a conviction that modernized equipment does pay, is worth while, and, in fact, is necessary to meet today's conditions. That is the primary reason why the convention will again be held at Cleveland, and I hope that those of you who will miss your stroll on the boardwalk will bear that in mind and line up with us to make this street car exhibit a further inspiration and a greater success.

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*Abstract of address before the Central Electric Railway Association at Toledo, Ohio, Feb. 3, 1927.

Right in this connection, in 1926 there was one street car manufacturing company that built one street car on its own initiative and sent it to Cleveland at its own expense. Just compare this situation with the bus manufacturer. True, they are not fairly comparable, but there is more than an opportunity for thought as to the necessity for initiative on the part of the car and equipment manufacturers.

Pride Goes with Proper Service

STREET car lines which are to continue to function as community enterprises must be modernized. Transportation practices must be on a merchandising basis. We must have a pride in the service we have to sell, and the community which buys our service must have a pride in it.

EQUIPMENT IMPROVEMENTS ARE NEEDED

These manufacturers are my brothers, as it were, and I feel closely akin to them, but owners, operators or manufacturers cannot be successful if we are to continue along lines which were prevalent ten or more years ago. We operators are attempting to meet the changed conditions due to privately owned automobile competition by making our service so appealing to automobile owners that more of them will of preference take our street cars. Our manufacturing brothers appreciate our situation and are endeavoring to satisfy us, but we need every ounce of help that they can give us, every ounce of initiative.

A short time ago I looked over some drawings of an axle with its accessories, which at first thought is almost revolutionary in the street car industry. I do not know whether the axle is practicable, but the manufacturer's representatives told me that they believed in it and proposed to give it a thorough test and demonstration, and I do know that I felt encouraged by the initiative shown by them and this evidence of their faith in the future of the electric railway industry.

TRANSPORTATION EXECUTIVES' HAVE RESPONSIBILITY TO COMMUNITY

There are today only comparatively few communities which are not to a greater or lesser extent handicapped by the fact that they have not as good transportation service as the needs of the community warrant and it is the duty of every electric railway executive to do all in his power to remove that handicap so that his community may grow and prosper. Transportation executives have a definite responsibility to their community to a greater extent, probably, than the executives of any other industry.

We discuss the competition from the privately owned automobile. It is real competition, which will continue to become more severe, nationally speaking. This competition makes it more difficult for the electric railway company properly to take care of the needs of the community, but public transportation still remains a necessity. Some one is going to continue to operate electric cars and buses as a part of our public transportation systems. Don't ever get away from that thought: Public transportation still remains and will continue to remain a community necessity.

You know the situation; I know the situation, but we have not yet sold to our public, our customers, the facts regarding the problem. We are a part of the community, an essential part, a life-giving part. We understand and recognize that fact, but too few of us have as yet convinced our communities of the necessity of actual, real, helpful co-operation with their electric railway companies.

I have not accomplished my own desires in this respect; I could do much more for the communities in which I operate than I am doing, if I could only win real co-operation. I have not yet sold to these communities the thought that by co-operation we can both merit and achieve success. It is one of our primary duties to sell ourselves and our companies to our communities. We know the needs of our communities from a transportation standpoint better than anyone else. We know what we can do for our community if given the opportunity.

How are we going to fulfill our duty to our community? If we expect justice to prevail with only a nominal effort on our part, we will be sadly disappointed. The community must eventually pay the cost of transportation service. Eventually it will see the light and eventually transportation will be brought up to the needs of the community. But the longer that "eventually" is put off the more we will suffer and the more our communities will suffer. We must meet this community problem more than half way. We cannot be content with simply stating the facts. We must prove to our communities in a manner more forcible than most of us have done, that in spite of all the handicaps of the day we can and will give them satisfactory service if we can but have their co-operation. To continue to give the same kind of service and to use the same kind of vehicles that we did fifteen years ago is not very convincing. Street car lines which are to continue to function as community enterprises must be modernized. Transportation practices must be on a merchandising basis. We must have a pride in the service we have to sell, and the community which buys our service must have a pride in it.

IMPROVED FACILITIES PAY

What companies are making the most distinct headway as to this community problem? Is it those companies that are staying in the rut and are not meeting the changed conditions of today with changed methods and changed equipment? Which of our companies are showing the greatest improvement in their balance sheets? Look over the list of Coffin Prize awards and Coffin Prize contestants and there is emblazoned the answer: The North Shore Line, the Northern Texas, the Pittsburgh Railways, the Penn-Ohio, Dallas, Grand Rapids, Buffalo & Erie, Interstate and many others. It is among this class of companies that you find men who are succeeding in their duty to their communities. It is this class of companies, owned and operated by men with vision, that are making better showings in their balance sheets.

Let me speak even more bluntly. I know that an appreciable portion of the present electric railway trackage is going in the discard. I personally know right where some of those lines are, but I also know that there is nothing to be gained by drilling our hard-luck stories into each others' ears. I also know that a continuance of past practices is not going to save our investments. I do not know just what should be done, but I do know that a large number of us must do differently than we have been doing or we are not going to save these investments. I also know that those companies that have been the most progressive in their changed methods are, as a class, making the best financial showing and stand out definitely in a class by themselves. Give heed, ye doubting executives, to the facts and figures so forcefully arrayed by Charlie Gordon.

Good Service More Important than Low Fares

There is one other phase of our community problem requiring not only salesmanship but courage. Good service is of far greater importance than low fares. I have pointed out that the elimination of public transportation service is unthinkable. Poor service means community stagnation. The community will eventually pay for no service or poor service the highest price of all—its very life. But let us take the average case of today where the community pays 7 cents for what should be 8½ cents service and progresses even though thus handicapped. There is no question in my mind but that the community would be the gainer if this service, economically and progressively administered, was appreciably increased in quality and quantity, and the fare also increased to meet the cost. The charge must equal the cost of the service. That is true of any business anywhere, but the particular point I am stressing is that the community, if it is to grow and prosper on a sound economic basis, needs even better transportation than is on the average being given today—and therein lies another duty of our industry to our communities. I believe in a 10-cent fare and in a 10-cent service, because I believe that under the conditions of this day and age the few extra pennies spent for car fare would contribute many-fold to civic development and prosperity.

Too Much Loose Talk on Buses

Now, just a few words about buses. There has been entirely too much loose talk about the bus eliminating the street car. I have in mind particularly the Chicago situation, which is local unto itself, political and chaotic. Nothing new, supernatural or mystical has happened within the last few months to warrant those who previously definitely advocated co-ordination completely to reverse their position and now advocate wholesale substitution; that is, there is nothing except selfish, mercenary motives. I have no hesitancy in saying that I do not believe that any thinking man who is familiar with the situation believes that the Chicago settlement is going to be on the ridiculous basis of eliminating the electric street cars. That would not be building up a community. Such a thought is not only contrary to all transportation experience, both here and abroad, but is particularly contrary to the experience in Chicago itself, where during 1926 the street cars showed an appreciable increase in passengers while the buses showed an appreciable decrease. In St. Louis the bus is not holding its own. Few responsible bus companies anywhere are making money from operation. There have been too many buses sold under high-pressure methods and used for blackmailing purposes. The use of a bus as a novelty and for joy-riding is wearing off. The glamor and air of luxury are short lived.

In spite of these facts, I want to say again, as I have said for a number of years, that we want and need the bus; that there will be many more buses used in the future than there are today, and that those buses will be co-ordinated with electric railway service by the community builders.

The electric railway operator has in the past used the word "co-ordination" with too little meaning. We have not a co-ordinated bus service simply because we are operating some buses. Neither the bus manufacturer nor the electric railway operator has been building for the future to the extent that it behooves us both to build. These large electric railway investments cannot be further jeopardized without definite loss to the communities. The electric railway executive cannot welcome the bus manufacturer who undermines those electric railway investments just for a temporary sale of today.

What I am saying is that although during the past few years we have shown definite progress toward co-ordination and co-operation, we see a clearer picture today than we did even a year ago and we should now get down to real co-operation and real co-ordination. We men who were primarily electric railway operators are perhaps slow moving and peculiar unto ourselves, but the bus manufacturer can afford to be patient with what appear to be our shortcomings.

Real Co-ordinated Transportation Needed

You bus manufacturers are here tonight because you are a part of this industry, and I believe it is essential and necessary for the prosperity of your business, of our business, and of our communities that we really work co-operatively.

Now, I have talked about the need for more buses, and have in a friendly way made suggestions to the bus manufacturers. I have also talked about the need for modernized car equipment and have in effect made suggestions to the electric car and equipment manufacturers. These two thoughts are not opposing. They are both included in the thought that we all owe a duty to our community and that we can best serve its development if it will but give us the needed co-operation toward a really co-ordinated, modernized electric car and bus transportation system, such as we can give it if we all work together.

Part of the fleet of 23 Mack six-cylinder gas-electric buses operated by the Capitol District Transportation Company (United Traction Company) on the 3½-mile Albia route, Troy, N. Y. This view was taken in front of the Albia Garage, formerly the carhouse, near the outer end of the route.

Buses Meet Severe Operating Conditions in Albany and Troy

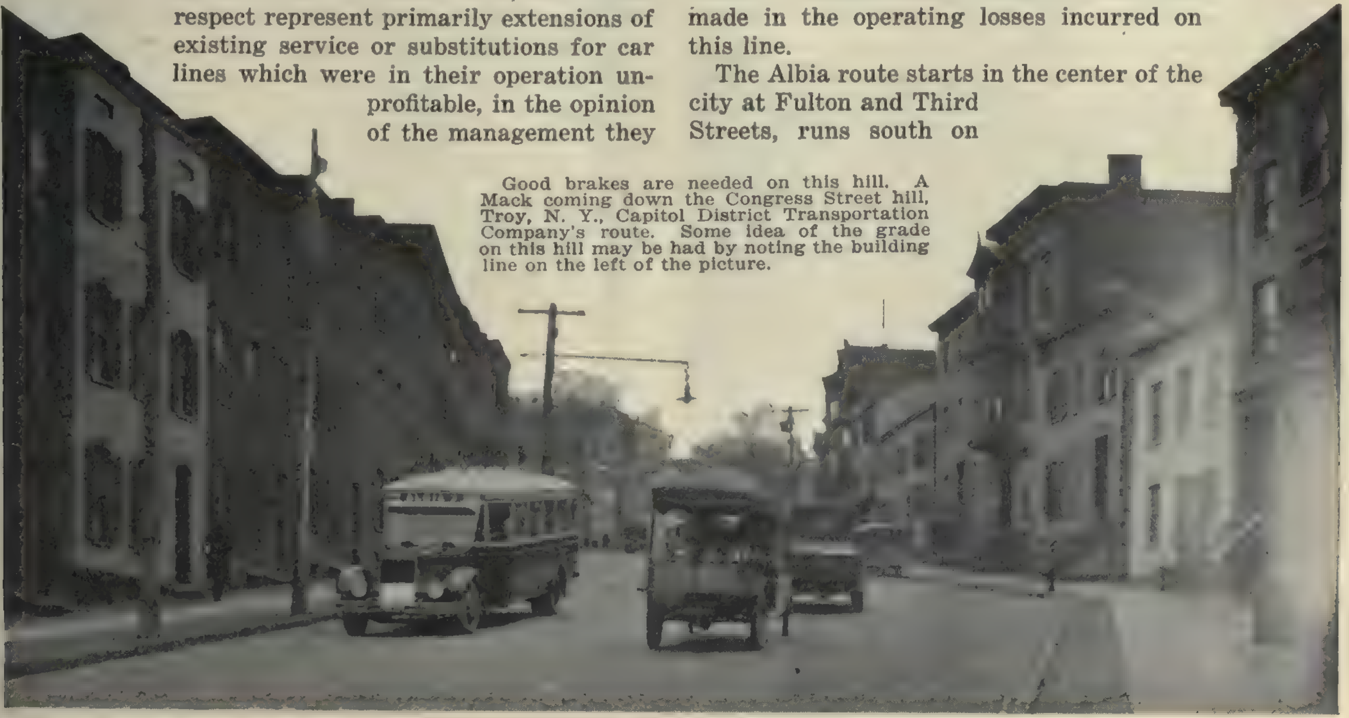
Experience with Successive Types of Buses Prove the Adaptability of the Six-Cylinder Gas-Electric Type for Frequent Stop Service and Heavy Grades

EXPERIENCE of the Capitol District Transportation Company in Albany and Troy, N. Y., has led the management of this bus operating subsidiary of the United Traction Company, Albany, N. Y., to a number of conclusions regarding the basis for successful operation of such vehicles. Ernest Murphy, general manager of the United Traction Company, is a believer in the possibilities of the bus. He insists, however, that the basis for successful operation cannot be found by relegating the bus to thinly settled territory in the outskirts, where it is impossible to show a profit with any form of transportation.

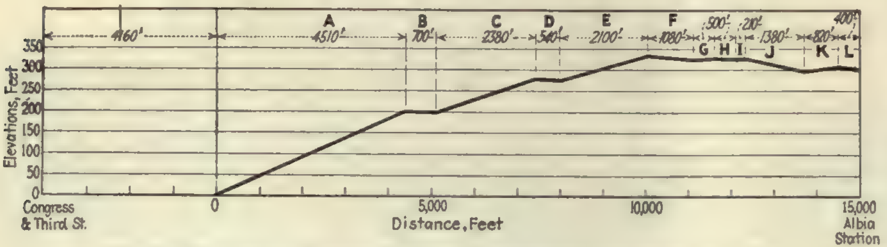
Although the buses in Albany and Troy are operated as street cars on rubber tires, and in that respect represent primarily extensions of existing service or substitutions for car lines which were in their operation unprofitable, in the opinion of the management they have permitted a substantial improvement in service. They have been the means of cutting down the losses incurred in the rail operations which they have replaced and of avoiding heavy and unjustified expenditures for track renewal and street paving.

On the Albia route in Troy 23 Mack six-cylinder, gas-electric buses have replaced the former trolleys and the rails have been removed. In this case the rail service was abandoned primarily because of a prospective heavy paving expenditure. The type of paving used here—cut Vermont granite block—costs between $5 and $8 a foot of track. At the present time the obligation to pave is fixed by state law. As the result of the substitution of buses a consideratble reduction has been made in the operating losses incurred on this line.

The Albia route starts in the center of the city at Fulton and Third Streets, runs south on



Good brakes are needed on this hill. A Mack coming down the Congress Street hill, Troy, N. Y., Capitol District Transportation Company's route. Some idea of the grade on this hill may be had by noting the building line on the left of the picture.



Graphic Diagram of Grade Problem Encountered by Buses on Albia Route of Capitol District Transportation Company, Troy, N. Y.

Section	Ft.	Av. Grade, Per Cent
A	130	5
	150	6.13
	60	5.0
	200	7.75
	425	9.17
	315	7.84
	230	5.87
	220	4.32
	420	3.73
	730	3.38
	370	1.60
	200	2.70
	100	1.43
	400	5.10
	260	3.27
	310	1.43
	4,510	4.5
B	400	1.0
	300	0.4
	700	0.74
C	450	2.38
	750	3.87
	420	6.30
	250	3.60
	510	0.5
	2,380	3.29
D	540	0.5
E	260	1.0
	300	1.37
	270	2.43
	300	4.40
	150	5.40
	320	4.32
	200	2.40
	300	0.6
	2,100	2.7
F	380	0.6
	700	0.87
	1,080	0.77
G	500	0.64
H	500	0.51
I	210	0.65
J	100	0.21
	275	1.20
	365	4.0
	640	2.5
	1,380	2.4
K	520	1.93
	300	0.40
	820	1.4
L	400	1.0
Total....	2.865 mi.	1.96

Third to Congress, east on Congress to Pawling Avenue and from there out Pawling Avenue to the Albia Station, a distance of 3¼ miles. The average grade over the entire route is 1.96 per cent. On Congress Street the maximum grade is 9.17 per cent. A profile of the line is shown in an accompanying illustration.

Bus equipment of the Capitol District Transportation Company consists of three Mack four-cylinder, gas-electric city type buses on the Oakwood Avenue route in Troy, 23 Mack six-cylinder gas-electric buses of special body design on the Troy-Albia route, two of the same type in Albany and two more in Rensselaer. There are nineteen Fageol gas-electric buses operating in Albany.

The company first began its experiments in Cohoes with four Brockway trackless trolleys. These were followed with two mechanical-drive buses operated in Rensselaer, which have since been replaced by gas-electric drive. Nineteen Fageol double-motor, gas-electric buses were then put in service on the Pine Hills and Arbor Hill lines in Albany. Three four-cylinder gas-electric Macks were tried out on the Albia route and were followed shortly by the type recently put in service, the single-motor six-cylinder gas-electric.

One of the Capitol District Transportation Company's Buses Negotiating the 9.17 Per Cent Grade Up Congress Street Hill, Troy, N. Y. Although This Illustration Does Not Indicate Clearly the Pitch of This Grade, Some Idea of It May Be Gained by Looking at the Building Line

This experimental work was dictated by the desire to find a bus suitable to cope with the particularly stiff problem which is met with in the Albany district, that of bad hills. The bus required had to have plenty of power to negotiate the grades. At the same time it was important that the weight and cost of operation be held to a minimum.

Mechanical - drive, four - cylinder buses were found unsuited for the work. Although they negotiated the Troy hills, their operation was slow. On the steepest grade a speed of only 3½ m.p.h. was possible. It was finally determined that mechanical-drive buses could not stand the service demands on the very steep hills encountered in Albany and Troy.

SIX-CYLINDER EQUIPMENT SHOWS IMPROVEMENT

The six-cylinder gas-electric buses are able to maintain an average speed of 7 m.p.h. on the Congress Street hill in Troy. The company feels that it now has a vehicle which provides practical transportation equipment for this service.

Mr. Murphy expresses the company's views on bus equipment as follows:

"We use gas-electric buses because they give us better service than mechanical-drive buses. They are time-savers on hills, as the acceleration is more rapid. Gears are slow enough under normal conditions, but on these hills they are practically impossible. Another reason is that they eliminate the expense of installing new gears and clutches in the buses periodically. The Albia route is up-grade practically all of the way in one direction and patronage demands at least eight stops to the mile or an average of 23 per trip. On our grades clutches won't stand very much of that kind of severe service.

"An operator cannot mix gas-electric and mechanical-drive buses in the same fleet. After driving gas-electrics, a chauffeur will not touch a clutch-driven bus if he can help it, and if he does drive one he often will abuse it.

"Another reason for gas-electrics here," Mr. Murphy declared, "is to relieve drivers of all duties not absolutely essential. Through experience it has been found that on grades such as ours much time is lost in shifting gears. There is also the question of safety. A driver can maintain control of his bus with one hand and both feet while collecting fares and making change. This saves time as well, in that not a moment is lost by collecting fares before starting the bus. I might mention that it takes considerable driving skill to get going in the middle of these grades with a gear-driven bus. A gas-electric takes hold easily and maintains headway without visible effort."

Co-ordinated Study of Rail Corrugation Made in Europe

International Union Committee Believes that Rail Quality and Track Condition Are Important Factors—Influence of Rolling Stock Is Now Being Investigated

By D. D. Ewing

Professor of Electric Railway Engineering, Purdue University, Lafayette, Ind.

REAL progress in the solution of the problem of rail corrugation can be made only by co-ordination of individual efforts and centralized direction of research work, according to a report presented at the recent Barcelona Congress of the International Union of Tramways, Local Railways and Public Transportation Automobiles by a sub-committee of the International Committee on the Standardization of Rails and Track Apparatus. The sub-committee, which consists of three railway operating officials assisted by an associated technical staff, was appointed at the Paris Congress of the International Union in 1924 and since its appointment has been devoting much time and thought to the corrugation problem. While the committee arrived at a number of tentative conclusions, it prefaces its report with the statement that it is not attempting, as yet, to present final conclusions, as such conclusions should be based on exhaustive tests and observations.

The initial work of the committee consisted of a careful historical review of past studies and observations on the subject. Its summary of these studies shows that there exist two principal current opinions on the subject:

1. The phenomenon is due to mechanical causes inherent in the rolling stock, track and methods of operation and maintenance. The undulatory wear is caused by an intermittent sliding of the wheels and a hammering of the rail. The length of the waves, being a function of the frequency of vibration of the materials involved, is proportional to the speed.
2. The rail contains within itself as it comes from the mill the germ of corrugation, and the external mechanical actions only develop still further the incipient waves. The length of the waves does not depend on the speed of the cars but does depend on the variations in hardness in the rail.

The majority of adherents to both opinions consider that track rigidity and dirt on the rails are aggravating causes.

As a second step in its work the committee sent a detailed questionnaire to member companies of the International Union. From the answers to this questionnaire a large amount of useful data were compiled and the analysis of these data resulted in the following conclusions by the committee:

1. Undulatory wear is encountered on light traffic lines as well as heavy traffic lines. However, it develops more rapidly on heavy traffic lines.
2. While no clear relation between type of rolling stock and corrugation has been found, the committee believes that cars whose ratio of wheelbase to total length is low and cars in which the body suspension is fairly rigid or stiff are more likely to cause corrugation than cars with a high ratio between wheelbase and total length and cars with a more elastic spring suspension.
3. Corrugation is found on narrow gage as well as on normal gage track and on elastic track as well as on rigid track. However, the general experience is that paved track is more likely to corrugate than open track. The committee suggests, however, that rather than being a matter of rigidity or elasticity it is a matter of the natural period of vibration of the rails that is involved.
4. Corrugations ordinarily do not develop on track where the car speeds are below 10 or 12 m.p.h except where caused by braking in the immediate vicinity of stops.
5. Corrugations usually occur: (a) On the outside rail in curved track; (b) on both rails in straight track in spots separated by a distance dependent on the amplitude of the nosing motion of the car.
6. In length the corrugations vary from 0.8 in. to 5.1 in. and the length depends on the car speed. It also seems to be a function of the car axle diameter; the weaker the axle the longer the wave.
7. Corrugation seems to be the result of a purely mechanical phenomenon which causes irregular wear by intermittent rubbing and hammering of the surface.
8. Corrugations will develop with either conical or cylindrical wheels.
9. The nature and quality of the rail are of capital importance. The metal should be of such character as will enable it to resist the irregular strains to which it is subjected. The elastic limit and per cent elongation should be as high as possible. Data so far available seem to show that rails whose product of breaking strength and per cent elongation are high are less susceptible to corrugation than others, providing also that the elastic limit is high.
10. Rails of large cross-section are more susceptible to undulatory wear than rails of light cross-section, probably because the metal in the lighter rails is worked better.
11. While surface hardening of the rails by the "in situ" or other process seems to retard corrugation, the available data are insufficient to justify definite conclusions.
12. Micrographic studies have developed nothing new in the way of conclusions as yet.
13. Type of rail joints *per se* does not influence corrugation, however defective joints may aggravate it.
14. Defective track condition is a common aggravating cause of undulatory rail wear.
15. While corrugations may be removed by grinding, experience has shown that sooner or later they usually return and the best preventive remedies seem now to be: (a) Use semi-hard steel of good quality and high elastic limit, and which requires a large value of total work to cause rupture by tension; (b) build the track very carefully and design the substructure to fit the sub-soil conditions; (c) use cars whose ratio of wheelbase to total length is as great as possible and whose suspension is conveniently elastic.

The committee commented at some length on the report presented at the American Electric Railway Association convention last year by the American committee on rail corrugation. In general it agreed with the tentative findings of this committee.

As a third phase of its work the committee has set up a research program. In introducing this program the committee makes the following interesting comment:

"The divergencies which are found among the different theories of undulatory wear are not so great as they might at first be thought. A retrospective examination of the question shows that it is possible to extract from the whole a mean opinion, susceptible of bringing all answers together, and which can be summarized as follows:

"Due to imperfections or to the nature of the track and rolling stock and due to speed certain forces result, which tend to cause the cars to deviate from the trajectory assigned to them by the track. The various reactions which result therefrom affect the rolling contact and make it irregular. Moreover, there are produced vibrations of the rails the character of which depend on the constitution and condition of the track.

"The irregularity of the rolling stock and the rail vibrations submit the metal of the rails to stresses which are of a nature to create undulatory wear. This being true, the undulatory wear is or is not produced according to whether the nature and quality of the metal will or will not allow it to give way under the stresses which are set up."

With this in mind the committee developed its research program to include the following three important elements:

1. An investigation of the qualities which rails must have in order properly to prevent undulatory wear.
2. A study of the influence of track condition on rail corrugation.
3. A study of other causes of corrugation, especially those which are inherent in the rolling stock.

The investigation of rail quality has been proceeding along several lines. Laboratory tests on specimens cut from rails taken up from tracks show that the total work of rupture ranged from 152 kg.-m. (1,100 ft.-lb.) to 175 kg.-m. (1,265 ft.-lb.) for corrugated rails. For undamaged rails the total work of rupture in every case exceeded 201 kg.-m. (1,450 ft.-lb.). The total work of rupture is determined from the area under the force-elongation curve which is plotted from tension test data.

Service tests which consist of placing rails of known physical qualities in locations where severe corrugation occurs in ordinary rails are under way but as yet have not been under observation long enough to yield definite results.

As a result of its work on rail quality, however, the committee submitted the tentative recommendation that rails should be preferably of semi-hard quality with high elastic limit and with a high per cent of elongation.

A further specification to insure that the total work of rupture shall be high is that $R + 6A \geqq 175$, where R is the ultimate strength in kilograms per square millimeter and A is the per cent elongation.

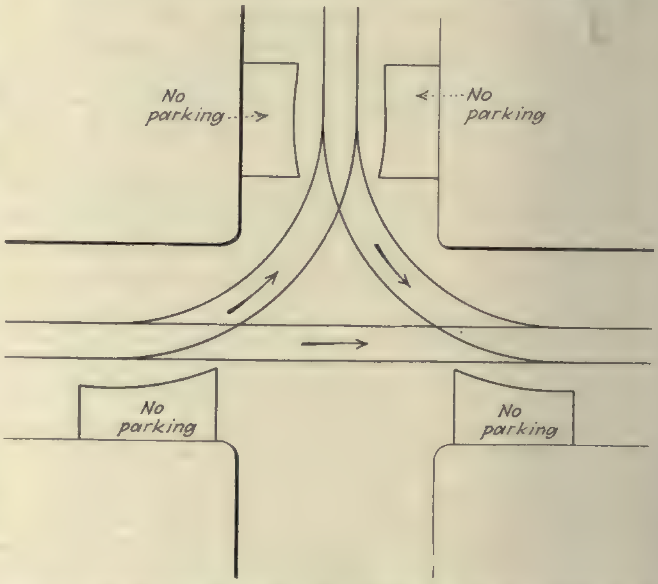
The studies so far made on the relation between track condition and rail corrugation have developed the conclusion that it is necessary to attend particularly to the details of track construction and maintenance as slight track imperfections aggravate the undulatory wear on the rails.

The committee's work on the third phase of its research program is just getting under way and no conclusions were reported.

No-Parking Areas Established Opposite Railway Curves

WHITE curved lines have been painted on the pavement at street intersections in New Bedford, Mass., where the street car overhang or swing is sufficient to overlap part of the street used for parking automobiles. These lines have eliminated parking in places which would interfere with street car movements due to a lack of sufficient clearance. While the Union Street Railway paints the white lines, the police department enforces the no-parking regulations. The municipal governing body has assisted by passing effective regulations. One ordinance reads: "No vehicle shall be allowed to stand within the intersection of any street, nor within 10 ft. of any street corner, crosswalk, fire hydrant, pole, post or place designated as a stopping place for street cars or street railway buses except in cases of emergency or when directed to do so by a police officer in uniform."

No Parking Area Opposite Curve in Railway Tracks



In New Bedford White Lines Are Painted at Street Intersections Where the Car Overhang Is Too Great to Clear Parked Automobiles

Car stopping places in the traffic center of the city have been designated by city ordinances as no-parking areas, varying from 35 to 135 ft. in length. This ordinance has not only made street car entrances accessible to patrons but has materially speeded up traffic movements through the down-town section.

Effect of Abrasion and Compression on Rail Corrugation*

Energy That Is Stored by Elastic Deformation of the Axle Causes De-Torsion and Consequent Abrasion — Compression Causes Structural Changes in the Rail Metal

By Ch. Fremont
Paris, France

FOR a long time engineers have been studying rail corrugation and numerous explanations have been given, which partly contradict each other. Hypotheses have been established, but the experimental study of this subject has been somewhat neglected.

In the year 1920 we began to make some experiments in regard to the wear of rails, due to abrasion. It is believed that if slipping follows suddenly the rolling of a wheel on a rail, a tangential shock will be exerted on the tire of the wheel, due to sudden and excessive friction. Such a shock cannot be counteracted by an equal counter shock. It represents an amount of energy which is absorbed by an elastic deformation of the mechanical parts connected to the wheel, and which is generally taken up by the axle in the shape of a torsional twist.

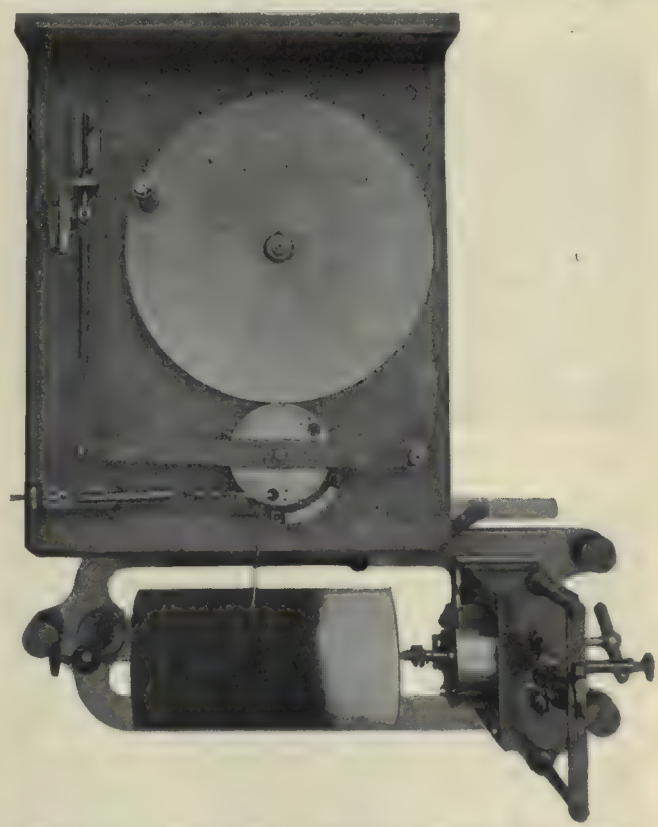
This elastic deformation, which is proportional to the intensity of the shock, stores an amount of energy that, when released, causes the wheel to turn rapidly in the opposite sense, causing a de-torsion of the axle. This will cause a grinding of the tire against the rail, accompanied by local friction. Additional shocks will follow the first one for the same reasons, and these will cause undulatory wear of the rail, due to a number of successive jerks of the wheel.

DEMONSTRATION OF TANGENTIAL SHOCK

In order to demonstrate the tangential shock on the wheel of a car, we have built a mechanism which is shown in an accompanying illustration. In this mechanism the rail moves while the wheel remains stationary. In order to give the rail a continuous motion of sufficient speed, it has been replaced by a large disk with central horizontal axis, and a small handle near the periphery by which it may be turned. Above this disk, and in the same plane, is placed a small disk representing the car wheel. In order to show the effect of changing the weight on the wheel, the small disk has its axle in a lever, at the extreme end of which is fastened a heavy spring the tension of which can be regulated at will.

If the large disk is turned by hand in a clockwise direction the small wheel will try to revolve counterclockwise; but it is prevented from doing this by a spring near the uppermost point of its periphery, which exerts a tangential pull on this wheel.

If the pressure of the small wheel against the large wheel is moderate, and if the speed of driving the large wheel is small, the sliding friction between the two exerts a slight tension on the tangential spring. This spring tension remains constant as long as the speed with which the large disk is revolved does not change. If the force which presses the small wheel against the large wheel is gradually increased and the driving speed rises, the sliding friction will be increased, and the upper wheel will pull strongly on the opposing spring.



Mechanism to Record Tangential Shock Produced by a Wheel

At first it will be found that the pull on the upper spring rises continually and proportionally to the sliding friction. At a certain instant, however, when the pressure on the upper wheel and the speed of rotation is constantly increasing, the sliding friction suddenly becomes erratic and tangential shocks will appear, which subject the upper spring to sudden tensions, and it will be seen that the spring rebounds quickly after each tension.

A stylus fastened to the upper wheel inscribes upon a revolving drum its movements. The oscillations of the upper wheel, produced by the tangential shocks, are the cause of undulatory wear of the rails.

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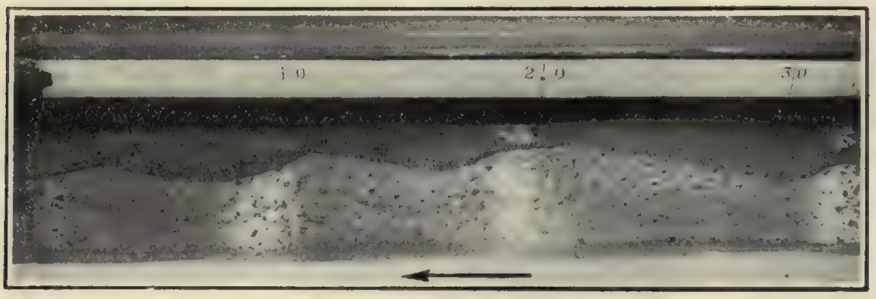
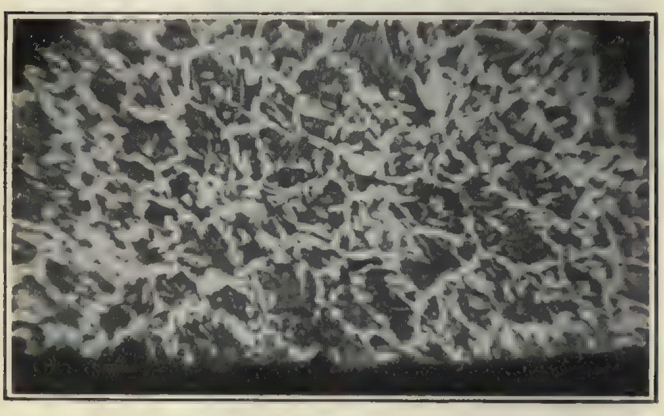
*Abstract of an article published in *le Génie Civil*, Nov. 13, 1926.



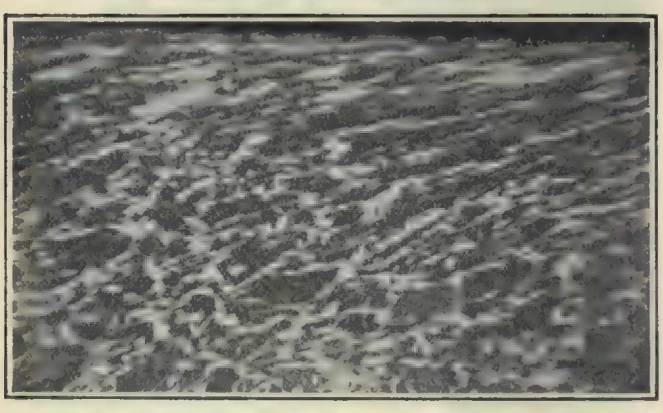
Rail Corrugation Caused by a Conical and a Cylindrical Wheel Tire
The undulations of unequal length are superimposed. The surface is locally deformed, particularly on the side of the groove. Arrow indicates direction of motion of the car.

Abrasion, however, is not the only cause of undulatory wear. In certain cases we have observed on the rolling surface of rails enlarged surface spots of considerable lateral width, which indicate local crushing effects. In an accompanying illustration the rolling surface of a corrugated rail is shown. The individual undulations are not equal in length, and have been produced by both conical and cylindrical wheel tires. The undulations produced by either of these two types of wheel tires are corresponding.

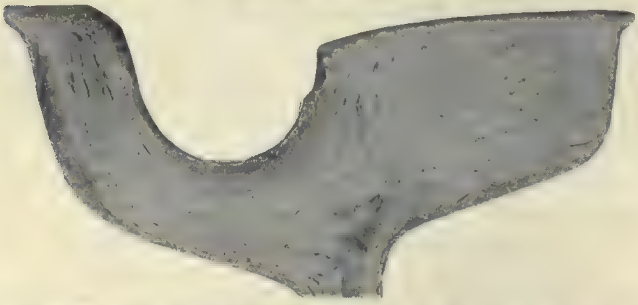
In this illustration the light portions represent the tops, while the darker portions represent the recesses, of the undulations. In the recessed portions, due to the crushing effect, a widening of the metal sideways can be noticed. We have to deal in this case, therefore, not with undulatory wear but with a spreading of the metal due to compression.



Transverse Cut Through the Head of a Rail Passing the Crest of a Corrugation—60 Diameter Enlargement



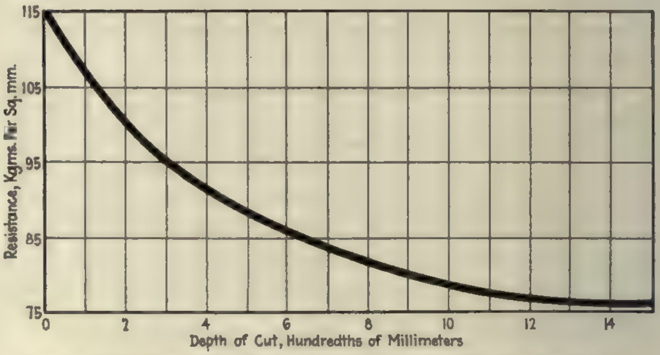
Transverse Cut Through a Rail Head, Passing the Depression—60 Diameter Enlargement



Transverse Cut Through a Rail Head, Showing Distribution of the Displacement and the Side Deformations on the Rolling Surface

A microscopic investigation bears out this assumption. A transverse cut through the top of one of the undulations, enlarged 60 diameters, is shown in an accompanying illustration. In this figure the steel grain is not noticeably deformed at the surface of the rail. Another view shows a transverse cut through the metal of the adjacent hollow. It indicates that the metal therein is greatly crushed near the surface, and it shows a distinct side flow of the metal, which would not be caused by frictional wear. A transverse cut through the head of the investigated rail shows the side flow of the metal near the rolling surface, which is indicated plainly by the very apparent sidewise displacement of the metal.

While it is being deformed at the rolling surface of the rail, the steel is hardened locally. It is therefore important to ascertain the effect of this local hardening upon the resistance of the rail. In order to determine, at least in an approximate way, the degree of this hardness, we have measured the length of the indentation caused by a cutting wheel 60 mm. (2.36 in.) in diameter pressed under a weight of 50 kg. (110 lb.) into the head of the rail. The arrangement for this test is shown in an accompanying illustration. The impression caused by this wheel into the rail head was measured for every 100th mm. (0.0004 in.) depth, beginning at the surface of the rail, and disclosed the relative hardness of a great number of layers of steel near the rolling surface.

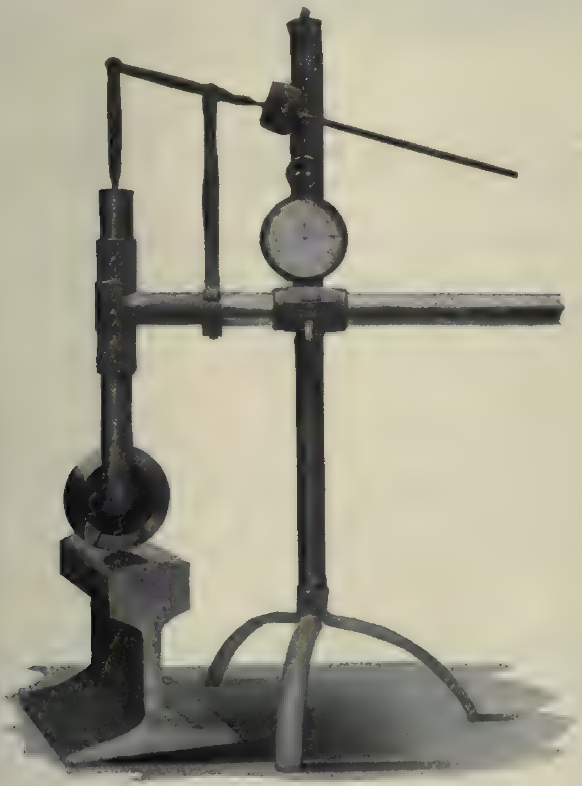


Hardness of the Rolling Surface of the Rail, as Shown by a Weighted Cutting Wheel

The chart is a representation of the results so obtained on a steel rail covering a range of 3 or 4 mm. (0.12 or 0.16 in.) below its rolling surface. The rail itself was made of steel with 75 kg. per square millimeter (105,500 lb. per square inch) rupturing strength. The rail was worn a few millimeters, but its surface was regular and not unusually deformed. In this curve the abscissas indicate the thickness of the hardened steel, while the ordinates indicate the corresponding hardness. The curve shows that the hardened skin has a thickness of just about 0.14 mm. (0.0055 in.), and that, on its very surface, its hardness corresponds to a tensile strength of approximately 115 kg. per square millimeter (162,000 lb. per square inch). On a softer rail with a deformed rolling surface we have found the thickness of the hardened skin to be approximately 0.23 mm. (0.009 in.).

DISTRIBUTION OF PRESSURE IMPORTANT FACTOR

There is one more absolutely necessary detail which must be known for the study of corrugations. That is the distribution of pressure upon the rolling surface of the rail when the wheel of a vehicle passes. We have found good success in determining this local pressure with the following method: a small piece of paper is placed on the rail, and after the car has passed over this paper a certain impression-design will be found thereon. This method of obtaining an impression sample on the surface of the rail while a car passes over it is shown in an accompanying illustration. After having chosen his location, the operator holds a piece of paper on the rail surface with a pair of specially made long-handled tongs and awaits the passage of a car at a certain speed over it. After the first wheel has passed the operator pulls the paper out quickly in order to prevent a second wheel passing over it.



Arrangement for Testing the Strength by Means of a Weighted Cutting Wheel

Other illustrations show reproductions of two pieces of paper so obtained. On these impressions is seen the local distribution of the compression caused by the wheel upon the rail, and to a certain degree the varying intensity of this pressure. The higher the compression per surface unit, the more the paper becomes squeezed, the more transparent it becomes, and the whiter its photographic image.

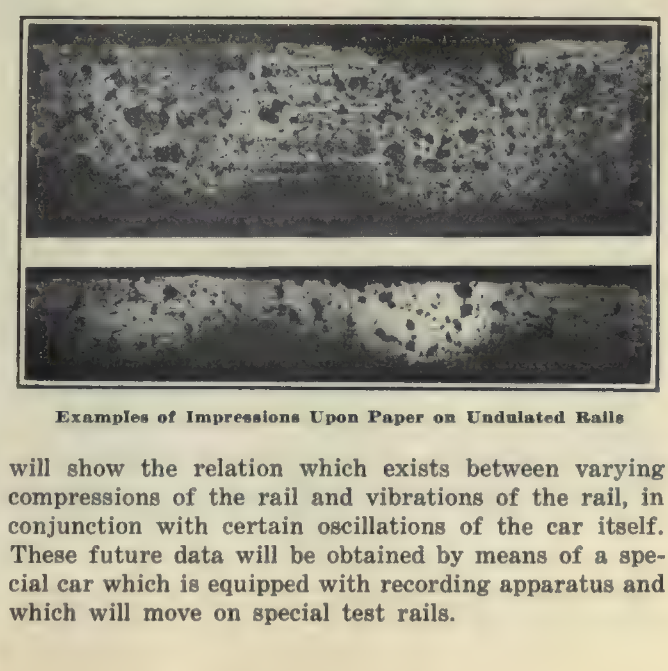
Method of Obtaining Impressions on Paper, Showing the Pressure Effect of a Passing Wheel Upon the Rail

For example, in the upper view we may readily see that in the places where the surface contact was greater, the compression also was greater. Between two maximum spots of crushing, indicated by either intensity or by surface, the impression shows a darker tint, indicating a smaller unit pressure and a reduced contact surface. We find, therefore, that the wheel has pressed upon the rail in an irregular manner, without, however, being itself the cause of the varying compression noted.

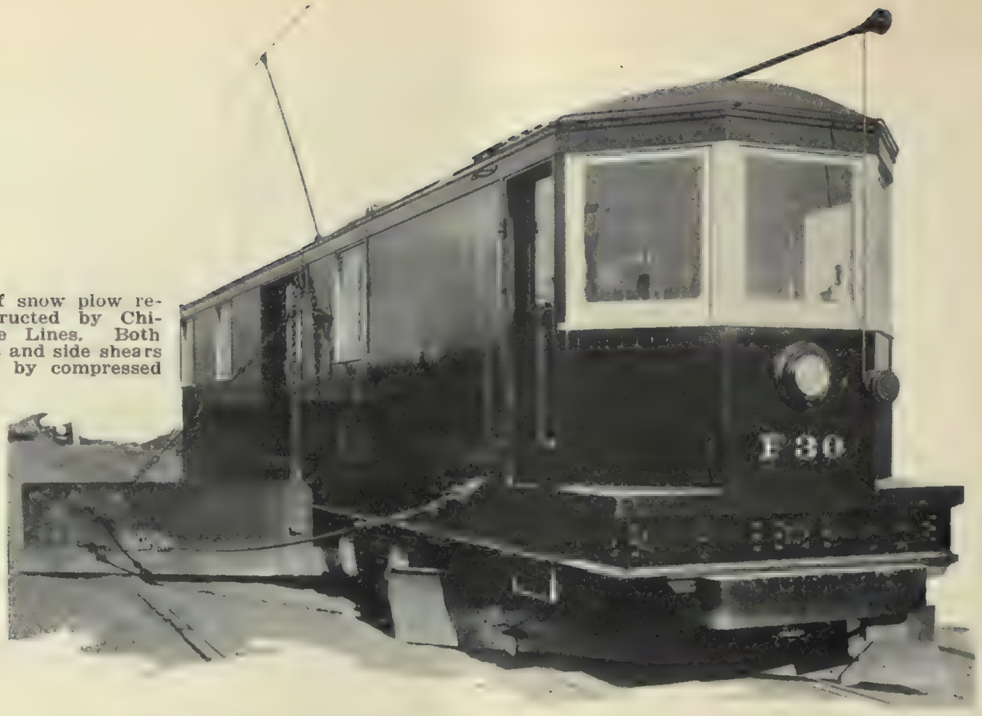
This method of registering the effect of wheels upon rails is of considerable exactness. It reveals also surface faults of the rails, such as small corrosions, striæ from friction caused by the wheels, etc.

All the methods described herein of studying certain phenomena of rail deformations have given us already considerable data, and we expect to make additional new tests which we hope will give us all causes of undulatory wear.

A second part of this investigation, which is to follow, will show the relation which exists between varying compressions of the rail and vibrations of the rail, in conjunction with certain oscillations of the car itself. These future data will be obtained by means of a special car which is equipped with recording apparatus and which will move on special test rails.



Examples of Impressions Upon Paper on Undulated Rails



Exterior of snow plow recently constructed by Chicago Surface Lines. Both center shears and side shears are operated by compressed air.

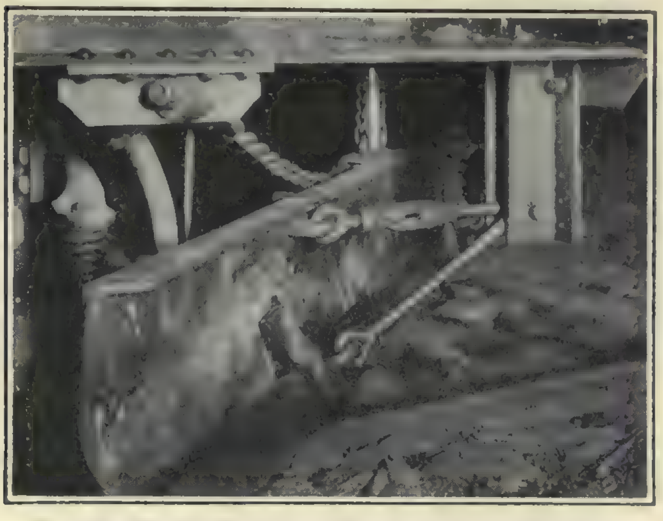
Chicago Builds an Improved Snow Plow

Double-Truck Unit Built in Shops of the Chicago Surface Lines Is Arranged for Double-End Operation and Carries a Central Shear at 45 Deg. Under Each End—Two Wings Clear Side Area—All Four Shears Are Operated by Compressed Air

By W. C. Wheeler

Engineer of Equipment Chicago Surface Lines, Chicago, Ill.

ON JAN. 14 of this year the new snow plow completed last fall in the West Side shops of the Chicago Surface Lines had its first real test. Snow fell during the day, finally reaching a depth of 9 in. This new unit operated continuously, clearing many miles of track. At the same time it avoided delays by maintaining its place in the schedule. The air-operated wings and shears were easily adjusted and shifted to avoid street and traffic obstructions.



Close-Up View of the Center Shear Set Ahead of the Front Trucks at an Angle of 45 Deg.

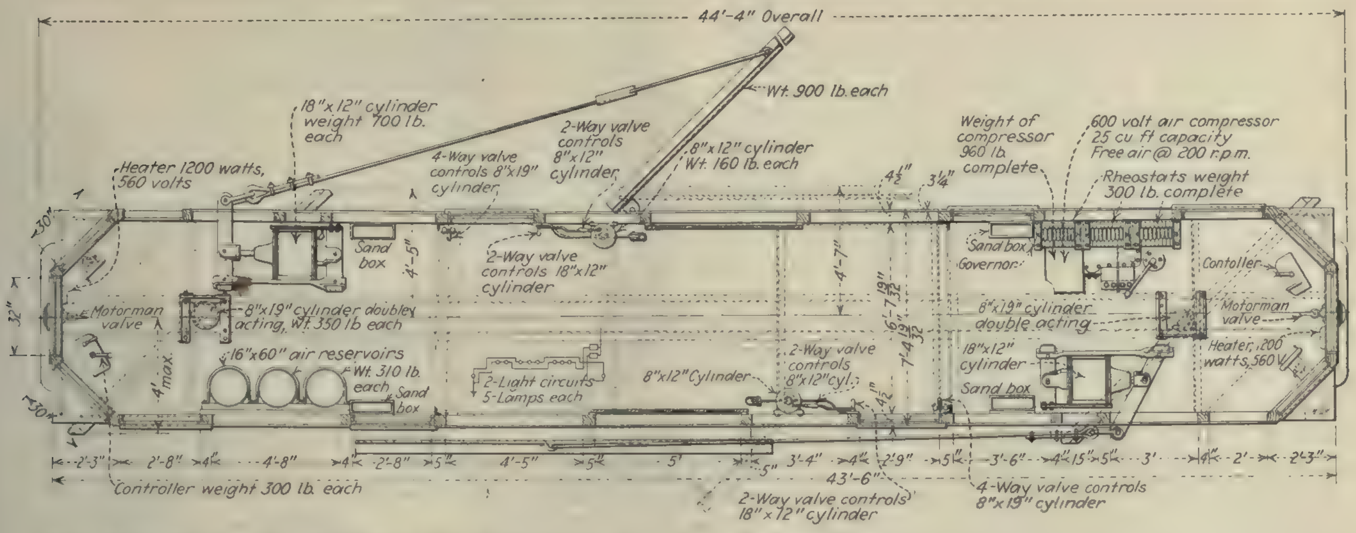
This shear is supported so that it drags, thus being able to raise and clear in case paving stones, manhole tops or similar obstructions are encountered.

Experience gained in Chicago during a heavy snow storm during the latter part of March, 1926, showed the difficulty of handling snow by means of sweepers. Snow that fell during that day was packed by auto trucks faster than the sweepers could remove it, and before the heavy wings could be put in service the limitations of the equipment used in keeping the track open were obvious. As a result of this experience the new plow was designed and constructed by the Surface Lines under the direction of H. H. Adams, superintendent of shops and equipment, during the summer and fall months of last year.

The plow is arranged for double-end operation and, as shown in the accompanying illustrations, carries four shears, two for clearing the track surface and two for clearing the street area. Only one pair of these shears is operated at a time.

Two men operate the plow; one, a motorman, devotes his attention to running the car, and the second controls the shears by means of compressed air, his position being by the side window in view of the wing.

This plow has been so satisfactory that it is believed possible to clear away a snowfall much faster and with better results than with a sweeper. The combination of air-raising and lowering of the front shear, the ability to provide pressure by means of the double-acting air cylinder to hold down the front shear and the air operation of the side wings are points of marked superiority in the design. The front shear is also pulled rather than pushed, so that it automatically lifts in case it strikes a paving brick or other rigid obstruction.

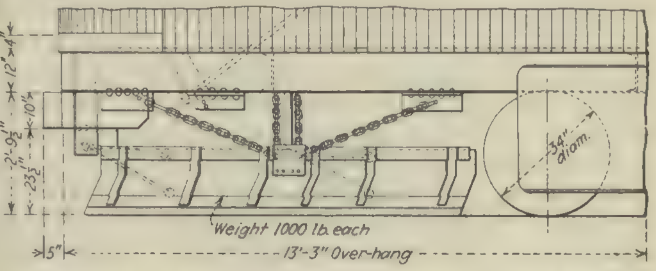

44'-4" Overall
18"x12" cylinder weight 700 lb. each
Wt. 900 lb. each
2-Way valve controls 8"x12" cylinder
4-Way valve controls 8"x19" cylinder
8"x12" cylinder Wt. 160 lb. each
Heater 1200 watts, 560 volts
Weight of compressor 960 lb. complete
600 volt air compressor 25 cu ft capacity Free air @ 200 r.p.m.
Rheostats weight 300 lb. complete
4½"
3¼"
30"
Sand box
4'-5"
2-Way valve controls 18"x12" cylinder
4'-7"
Sand box
Governor
Contoller
32"
Motorman valve
8"x19" cylinder doubley acting, Wt. 350 lb each
8"x19" cylinder double acting
Motorman valve
6'-7 19/32"
7'-4 19/32"
16"x60" air reservoirs
Wt. 310 lb. each
4' max.
Sand box
2-Light circuits 5-Lamps each
8"x12" Cylinder
2-Way valve controls 8"x12" cyl.
18"x12" cylinder
Sand box
Heater, 1200 watts, 560 V
4½"
30"
2'-3"
2'-8"
4"
4'-8"
4"
2'-8"
5"
4'-5"
5"
5'
5"
3'-4"
4"
2'-9"
5"
3'-6"
4"
15"
5"
3'
4"
2'
2'-3"
43'-6"
Controller weight 300 lb. each
2-Way valve controls 18"x12" cylinder
4-Way valve controls 8"x19" cylinder

Floor Plan, Showing the Dimensions and Arrangement of Equipment in the New Snow Plow Recently Placed in Service by the Chicago Surface Lines

This is a double-truck, double-end, steel-framed car that is capable of performing the work of snow removal on Chicago city streets and maintain its place in the operating schedule.

Until recent years the snow-fighting equipment has been divided into two general classes, sweepers and plows. Often the sweepers were able to handle all the snow. Due to heavy automobile traffic, especially in congested centers, the snow often becomes packed into the flangeways so that plows have become increasingly valuable. Sweepers are often unable to remove this hard-packed ice and snow. Many plows constructed in the past were not flexible enough to permit rapid operation in congestion. If they were heavy enough to do the work, they were cumbersome and it was difficult to manipulate the wings and shears.

The bare steel frame constituting the structure of the plow weighs 10,000 lb. The various pieces of equipment used increase its weight to 62,150 lb. without the use of dead weight. The general floor plan and side elevation detail are shown in accompanying drawings. Most of the equipment used was taken from spare stock and was arranged in the car body in such a manner as to leave a roomy interior. This is indicated in the interior view.



Partial Side View Showing Method of Support of Front Shear on New Snow Plow Built by Chicago Surface Lines

Each center shear has a dead weight of 1,000 lb. and is supported at an angle of 45 deg. One is located in front of each truck. These shears are arranged to drag, since the points of support are ahead of the shear edge. For this reason the shear will free itself if it meets a solid obstruction. Each shear can be raised by means of the air cylinder mounted behind the motorman's

Interior of Snow Plow Showing the Air-Operated Cylinders for the Side Shears Hung on the Side Wall

At left—In the center of the car just behind the motorman's position is a vertical double-acting air cylinder used for raising the center shears or for applying additional downward pressure. To the right is the cylinder used for holding the side wings in place, or releasing them, so that they may swing against the sides of the body. The plow is operated by two men, one a motorman, who concentrates his entire attention on driving the car; the other, standing at the side window, operates all of the cylinders that are controlled by means of air.

At right—Close-up view of the double-acting air cylinder controlling the center shear. The mechanical device shown at the bottom of the cylinder locks the shear in the upper position.

position in the center of the car, as can be seen in two of the views reproduced. The shears are made of ½-in. steel plate, 18 in. wide by 12 ft. 3 in. long, reinforced with a single angle at the top, and a double angle at the bottom. Six angles placed vertically on the back of the shear stiffen the blade. The edge of each shear is reinforced by a 1-in. x 6-in. steel wear plate fastened to the lower edge, which in turn is supplemented with two tool-steel bits set so as to follow the rail and clear the flangeway.

The cylinder that operates each center shear has an 8-in. diameter, with a 19-in. stroke, and is double-acting. It will either raise the shear and hold it above the street surface, where it may be locked mechanically, or with the air above the piston the downward pressure on the shear can be increased by 4,275 lb. In case of striking an obstruction the shear will always be readily raised against the air cushion of the piston. This extra downward force is useful in cutting hard-packed snow and ice.

SIDE WINGS OPERATED BY COMPRESSED AIR

Originally the plow was equipped with 10-ft. side wings weighing approximately 675 lb. each. Due to the experience gained in the first trial of this plow, these were replaced with 14-ft. wings weighing some 900 lb. In this way a sufficiently wide roadway is cleared along the side of the track for vehicular traffic. The plow had ample power and weight to operate the longer wing successfully.

Each side wing is fastened by a 2-in. bolt to a 1-in. plate bent in the shape of a U and arranged to slide up and down on a 2½-in. pin supported at the pivot fastening. This U plate allows the wing to swing out from the side of the plow in an arc with the pivot as a center. The bolt allows the wing to swing in a vertical plane around it as a center. The combination makes a very flexible joint, and the wing cannot stall as it will lift at the outer end and clear itself when pulling in very deep or hard snow.

This side wing is made of ⅜-in. plate 36 in. wide and 14 ft. long. It is curved at the bottom on a 12-in. radius and reinforced with 4-in. x 3-in. x ⅜-in. L-shaped steel members the entire length. The plow is pulled by a 1-in. steel cable attached to two points of the shear. A chain connection made at two other points, as shown in one of the illustrations, is used for raising or lowering the wings by the vertical 8x12-in. brake cylinders inside of the body.

Provision is also made for locking the wings in the raised position when the snow plow is moved about not in active service.

New Bus and Truck Repair Shop for the Los Angeles Railway

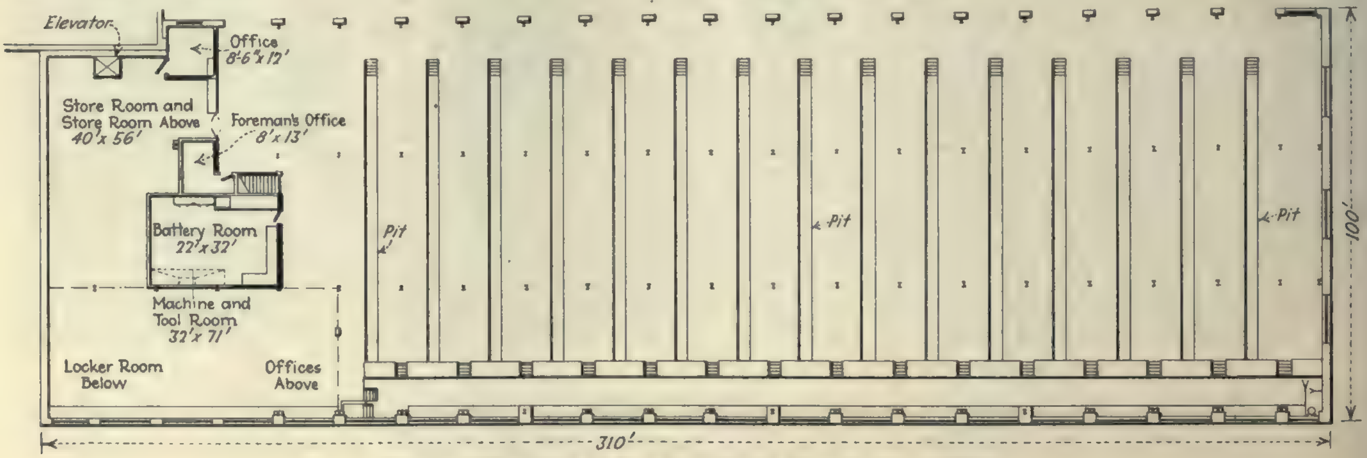
GENERAL bus, truck and automobile inspection and repair work are provided for by the Los Angeles Railway in the recent award of a contract to the Willard Brent Company for the erection of a modern brick, reinforced concrete and steel structure. The building will be erected along the Fifteenth Street frontage of the property of the railway company known as the Sixteenth Street yard. It will be 310 ft. long and 100 ft. wide and will provide pit accommodations for 30 buses. It will also contain store room, machine shop, battery room and offices for the superintendent of automotive equipment. There will be three floor levels, a depressed area, ground or main floor level and the mezzanine floor at the east end of the building.

The stores department will have quarters both on the ground and the mezzanine floors. The two floors are connected by a hydraulic elevator. The machine shop and battery room are to be located immediately below the mezzanine floor. The machine shop will be equipped with lathes, milling machines, cylinder grinders, etc., although no heavy or production work will be done here, as that is all done at the company's main shops. Plans call for three traveling cranes the length of the shop.

The buses can be driven in from the Sixteenth Street yard directly from the ground level over the pits. Along the northerly side the floor is on the same level as the bottom of the pits. The main benches are to be located along the northerly wall, where the greater part of the bench work will be done. On the southerly side of this depressed area there are benches which will accommodate men working in the pits. This permits the men to walk directly in and out of the pits without climbing in and out, as is the usual custom.

All lights in the pits are to be recessed, and convenient recesses will also be provided in the pits for the mechanics' tools. On the main or ground level floor work benches are to be constructed directly over the benches used by the men at work in the pits. The upper tier of benches are for the accommodation of mechanics working on the ground level.

The basement located at the east end of the building will be devoted to locker rooms and toilets. The locker rooms will be equipped with full-length steel lockers, spray wash basins and showers. All plans for the structure were drawn by the engineering department of the railway. The contract price does not include the lighting system, which will be under the control of the engineering department.



Plan and Elevation of New Bus Repair Shop in Los Angeles

The Readers' Forum

Cleanliness a First Requisite

HUDSON & MANHATTAN RAILROAD
NEW YORK, N. Y., Jan. 19, 1927.

To the Editor:

Stimulated interest in the important subject of improving car appearance is desirable. Personally, I believe cleanliness is the first requisite, and if the proper spirit is instilled into an organization to desire that all cars, equipment, stations and shops be clean and be kept in a tidy condition, many troubles will be overcome and the public will feel that it is being served properly. Next to cleanliness I believe that a pleasing lighting of cars should receive consideration.

R. R. POTTER,
Superintendent of Car Equipment.

Old Cars Should Be Replaced as Fast as Possible

DEPARTMENT OF STREET RAILWAYS
DETROIT, MICH., Jan. 20, 1927.

To the Editor:

There seems to be a general realization that the appearance of street cars should be improved and made more comfortable and inviting to the traveling public. This is merely the following out of general principles. An evil of any description will usually run its course, then eventually be corrected. The longer the duration and the greater the evil, the more drastic will be its correction. This particular evil has run for many years and has been particularly bad. Therefore it is not surprising that considerable excitement is being manifested in some instances at this time.

The big majority of cars have been dirty, unpainted and noisy. Little attention has been given to passenger comfort; therefore the traveling public shows good judgment in turning to an automative conveyance that is comfortable, quiet and clean. The logical thing, then, is to build a quiet car, put in good seats, and keep it well-painted and clean. Car riders are not hard to please; if they were, they would have raised a riot along these lines years ago. My observations indicate that all they demand is good horse sense.

Streamline bodies and like things are all right to incorporate when the car is being built, if not carried too far. To be consistent and enduring, from the standpoint of appearance, it must look like what it really is—a trolley car. Neither is it necessary to paint it all the colors of the rainbow in fantastic design. Dolling up old equipment must be done with sound judgment, otherwise considerable money will be wasted on cars that don't warrant the expense, and taking an old car in and giving it a coat of many colors, and this and that, will help little.

Probably on many properties some of the best, most modern cars may be improved by reducing noise, adding more comfortable seats and repainting economically with the regular color design. If they are kept clean 365 days a year they will prove satisfactory. The very old cars should be replaced as fast as possible with new, quiet, comfortable cars, but not necessarily an extravagantly dolled-up affair.

A. C. COLBY,
Superintendent of Equipment.

Speedy and Attractive Cars Needed

ERIE RAILWAYS
ERIE, PA., Jan. 22, 1927.

To the Editor:

From the tone of many articles that have appeared, one might infer that the railway industry was looking forward to a day when some genius would think of a plan to create a desire on the part of the public for more car rides per capita. It seems to the writer that no great wizardry is required, at least to those who have been in the business for the past twenty years, to know that the people have grown accustomed to doing all things more rapidly than they did ten years ago, and in the matter of transportation over comparatively short distances the matter of expedition is outstanding in their minds, even though they may have nothing to do after they have reached their destination. This appeals to the writer to be the first requisite in serving the people in competition with their own private transportation system.

Secondly, the character of vehicle plays a most important part in the psychology of making their trip as agreeable to them as possible. Although the auto has brought changes in the habits of the riding public, human nature remains the same and there is still the feeling that one does not desire to be associated with anything that appears to be unsuccessful. Therefore, it is not to be wondered at that during those trying days which are passing, the public generally became imbued with the idea that street railways were about to break down, for in many instances, in order to overcome burdensome franchise and fare conditions, that kind of a picture had to be painted. We now have the reaction which we unfortunately brought upon ourselves.

The very fact that the railways have passed through the most trying period of their existence and are proving their necessity should give us the greatest courage in attacking the problems in the future. The public is learning fast of this necessity, and in order to accelerate their inclination to resume patronage the operators of every road that expects to profit by this attitude must show to them that they are alive to the situation. There is no clearer way of doing this than by providing vehicles that will not only make the best scheduled time but that will be most attractive. In this, we do not mean that all present cars must be replaced, but they must be modern in their appointments and kept in a clean and attractive condition.

On all sides evidence is found of properties that have not always enjoyed the best of relations with their patrons, that have since made an attempt to give the community service and equipment commensurate with the requirements of the city in which they operate and that have made themselves a strong factor in the community life and are profiting thereby.

While our property has no aged or recently purchased equipment, we have attempted to keep our cars equipped with modern devices, have several times changed painting schedules, so that we now have a color scheme that is outstanding. Every effort is made to keep the cars attractive, and we believe it has had a material effect in making for good relations with the community. We also feel that the money expended in this manner is more productive of return than any other investment we can make.

A. R. MYERS,
President.

Wide Range of Thinking on Service at Cost

EDITOR'S NOTE

During the recent meeting of some seven economic societies in St. Louis a reporter of one of the local newspapers wrote an article purporting to be comments on the service-at-cost franchise now being negotiated between the city and reorganizers of the United Railways of St. Louis, which is now in receivership. Unfortunately not all of the comments were used. Only those statements were included in the article that opposed the plan now well under way.

Two of the men interviewed were James C. Bonbright and Robert Hale of Columbia University and the third John Bauer of New York, identified with New York transit affairs under former Mayor Hylan.

As reported, the St. Louis interviews were in error on important details, as explained in the communication from Professor Bonbright, and by the others in interviews by a JOURNAL editor. The discussion was one of theory and not of specific fact as applied to the particular situation.

The St. Louis newspaper article was opposed to certain principles of public utility regulation as defined by practice developed during the last ten to fifteen years guided by frequent court decisions. Considerable comment has been provoked relative to the article. Two communications that represent the wide range of thought possible on this subject are herewith reproduced. One is a letter from L. R. Nash, vice-president of Stone & Webster, an economist of great experience, and the other is from James C. Bonbright of Columbia University in clarification and amplication of his reported views on service at cost.

COLUMBIA UNIVERSITY
SCHOOL OF BUSINESS

NEW YORK, Jan. 20, 1927.

To the Editor:

My attention has just been called to a recent article in the St. Louis *Post-Dispatch* which purports to quote a statement of mine as to the proposed "Service-at-Cost" plan for the St. Louis street railway system. In this article I am quoted as saying that the valuation of $58,000,000 agreed upon between the city and the company, as the rate base on which to inaugurate the plan, is an excessively high valuation. I wish to state that this article misquotes the statement which I made to the reporter of the paper. In view of the fact that I am not familiar with the basis on which the valuation of $58,000,000 was reached I am not in a position to know whether this figure is too high or too low. What I did say, and what I am ready to repeat, is, that in my opinion any valuation of street railways on the basis of present reproduction cost is excessive. Whether or not the $58,000,000 in question represents such a valuation is a matter on which I have not been informed.

I think it wise to add that the whole problem of valuation as applied to street railway enterprises that have previously been under a franchise agreement to charge a 5-cent fare is different from the situation which applies to an electrical company or to any other utility that has not been under a franchise obligation to make a limited rate of charge. Most of the street railway companies of this country accepted as a condition of their franchise an agreement that they would serve the public at a rate of 5 cents per passenger. This was a contractual agreement which promised to turn out very favorably for the investors, and there is nothing to indicate that the courts would have set it aside in favor of the public even if the 5-cent fare had yielded an excessive rate of return.

It so happens, however, that the 5-cent charge is grossly inadequate to yield a reasonable return on the invested capital, but it does not follow that street railway investors have a just claim to relief from this onerous contract any more than it follows that a speculator on the Stock Exchange has reason to complain if his agreement with another speculator involves him in a financial loss. According to accepted business principles the only claim that investors can fairly make as a matter of justice rather than expediency is that any revision of their franchise should preserve whatever earning power might have been realized under a 5-cent fare. It is true that reasons of expediency may justify the public in relieving street railway investors of some of the evil consequences of their original franchise agreements, but this expediency is dictated by considerations of good public service and not by considerations of fair treatment to utility investors. I am inclined, therefore, to be highly suspicious of any valuation of the St. Louis street railway system which reaches the figure of $58,000,000, as I do not believe that any such property values could be realized under a 5-cent fare, but in fairness to the company I should add that this opinion is tentative rather than final and that I did not express, and am not ready now to express, any positive conclusions on a matter to which I have been able to give very little attention.

JAMES C. BONBRIGHT.

BOSTON, MASS., Feb. 4, 1927.

To the Editor:

During the recent annual convention in St. Louis of national organizations of economists certain views were expressed regarding the future of service-at-cost operation of electric railways which invite further consideration. Among these views was one holding that to insure satisfactory service and fares the valuation embodied in a service-at-cost railway franchise must be low. Cleveland was cited as an illustration of long operation of this character under a valuation about 25 per cent less than the claimed fair value of the property, so fixed because the city "had the company at its mercy." It is claimed that similar operations in other cities under more liberal valuation standards have been less satisfactory.

Cleveland fares have unquestionably been low, but well-known favorable operating conditions and efficient administration have been important factors in the result, and at times the ability of the Cleveland company freely to make extensions of its facilities and service has been hampered by its lack of credit due to low capital value and correspondingly low authorized return thereon.

Simple computations will show that under normal conditions the difference between a fair valuation and a niggardly valuation will affect the rate of fare by a minor fraction of 1 cent. General experience with public utility properties in this country indicates that prosperous companies, not unduly restricted in their operations, have given the most satisfactory service and maintained the most friendly relations with their customers. The reason for this is the well-recognized fact that most people in this country are seeking commodities and services on a basis of quality and are willing to pay without question a reasonable price therefor.

Even the humble working man, for whom certain citizens have perennially expressed a profound sympathy, is more and more resenting the thought that he cannot afford quality. Illustrations, of which the number is countless, are not necessary to corroborate this statement. There is no reason to think that the average citizen, uninfluenced by political or newspaper agitation, will consider his payments for public utility service in any different light from those for other services or commodities. The view of the economists who are contending for cheap utility service is, therefore, not sustained.

Furthermore, service-at-cost operation is not in any essential respects different from regulation by the state commissions which is now in effect in more than three-fourths of our states. Service-at-cost agreements merely define in advance the pertinent factors upon which rates are based instead of having them fixed intermittently in rate cases, with the result that there is an automatic and prompt adjustment of rates to cost rather than a spasmodic and delayed adjustment. If, therefore, the contention of the economists is correct, that service at cost is successful only when a low valuation is involved, it must follow that regulation can be successful only on a similar basis. As has already been stated, such a contention cannot successfully be sustained in the light of extended experience.

The value assigned to electric railway property must in the long run be consistent with that placed on other property in order that credit may be maintained and new capital, necessary for expansion in keeping with community growth, secured in competition with similar needs in other industries.

There was also expression of opinion at the St. Louis convention that further service-at-cost agreements, such as are now under consideration in St. Louis, should be made, if at all, with extreme deliberation. It was contended that urban transportation is in a critical period, with the possibility that within a few years surface cars will be replaced largely by overhead or sub-surface rapid transit lines with bus feeders, and that any service-at-cost agreement which provides for amortization of investment in street-car facilities should be avoided because of the heavy burdens which might thereby be imposed on the riding public through rates of fare.

This is a rather surprising doctrine to emanate from an economist, implying that the public should be willing to pay a certain price for transportation but should not assume the burdens of any unusual costs logically incident to changes in methods or character of service which community or economic developments may require. Apparently it is expected that the investors in transportation facilities should have a limited moderate return on the investment (6 per cent being proposed in St. Louis), out of which they would provide for all unusual risks of the business. Why investors should assume such risks when they can obtain a return of 6 per cent or more from investments in bonds and other obligations which involve no such risks has not been made clear.

Under service at cost, as ordinarily defined, a community elects to be served by certain transportation facilities existing when the agreement was made, and stipulates that new facilities, whatever their character, shall be acquired only after full investigation and approval. Unless the community under these circumstances is willing to assume the responsibilities for such unusual amortization as changes in transportation methods may from time to time require, what it is really seeking is not service at cost but service at less than cost. Few communities and probably fewer real economists will admit that such basis of a franchise is equitable. We are living in a period of exceptional industrial and technical development. Old equipment and methods are being discarded for others in keeping with the demands of our unprecedented prosperity. When we buy current models of automobiles we do not demand of the manufacturers a guarantee that they will continue in fashion until worn out. Similarly, in all ordinary developments the ultimate consumer expects to bear the burdens as well as share the advantages of economic progress. There is no sound reason why the public utility field should be an exception to this rule.

Electric railway officials will not agree with the thought that the days of the street-car business are numbered or that the delays to street-car service caused by traffic congestion should be permitted to decrease to the point of extinction the usefulness of a form of service for which no suitable substitute has been found. Traffic congestion in our large cities is caused largely by automobiles, which make up about 80 per cent of the street traffic and carry an average of less than two persons (including the driver), whereas street cars, ordinarily constituting less than 10 per cent of the street vehicles, each carry more than fifteen times as many passengers. It is not clear why a minor group of vehicles performing a major and essential public service should be cast aside to make way for other vehicles performing a minor and, to a large extent, wholly unnecessary service.

The consensus of opinion of careful students of the problems of urban transportation, many of them having no connection with the electric railway industry, is that street cars offer an economical and essential form of transportation upon which the larger cities depend and will depend in the future until a size is reached where rapid transit lines, with their much greater investment, can be supported. It is not clear that even then surface cars will not be the most economical feeders. No city of more than 50,000 population has yet been able to find a satisfactory substitute for rail transportation, although a number have tried to do so.

It is, therefore, apparent that the danger or injustice in accepting this form of transportation as a factor, and ordinarily a major factor, in a new service-at-cost franchise is remote. Such a franchise may well provide for any form of bulk transportation that may from time to time be economical or expedient, and no community can fairly divest itself of the risks or costs which the future may develop incident to change in type or character of transportation consistent with the growth and progress of the community itself. L. R. NASH.

Underwriters' Label Placed on Many New Cars

DURING 1926 the Underwriters' Laboratories inspected and approved 446 new cars and one that was rebuilt. Following the approval the Underwriters' label was placed on the car, thus entitling it to a lower insurance rate.

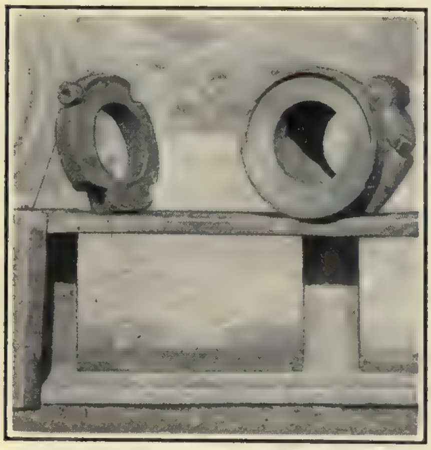
Because of several changes made in the Underwriters' standards and the development of new material for electrical insulation on street cars, it is now possible to obtain cars constructed fully within the requirements of the Underwriters' Laboratories standards with little or no additional cost. There is a nominal charge for the inspection and label of $5 per car.

At least in the eighteen states under the jurisdiction of the Chicago Actuarial Bureau the charge for defective cars is being prorated in the rolling stock fire insurance rate. As the number of inspected cars increases this rate will be reduced.

Maintenance Notes

Adjustable Collar Increases Axle Bearing Life

SHIFTING of motors along the axle has been eliminated, and excessive axle-bearing flange wear caused by dirt and brakeshoe dust has been decreased by the design and adoption of an adjustable, cast-iron axle collar by the Danville Traction & Power Company, Danville, Va. This collar was cast locally in accordance with the company's specifications and all machine work was performed in the shop.



Old Collar on Left and New Adjustable Dust-Deflecting Collar on Right

The axle collar is cast in two pieces and bored accurately to obtain a tight axle fit. Lugs drilled for ¾-in. bolts provide a means for solidly clamping the collar to the axle. Similar drilled lugs cast at one end of each section of the collar provide for the installation of ¾-in. machine bolts to be used for maintaining the proper relationship between the wheel hub and the axle-bearing flange. These bolts are provided with locknuts to lock the adjusting bolt in any desired position.

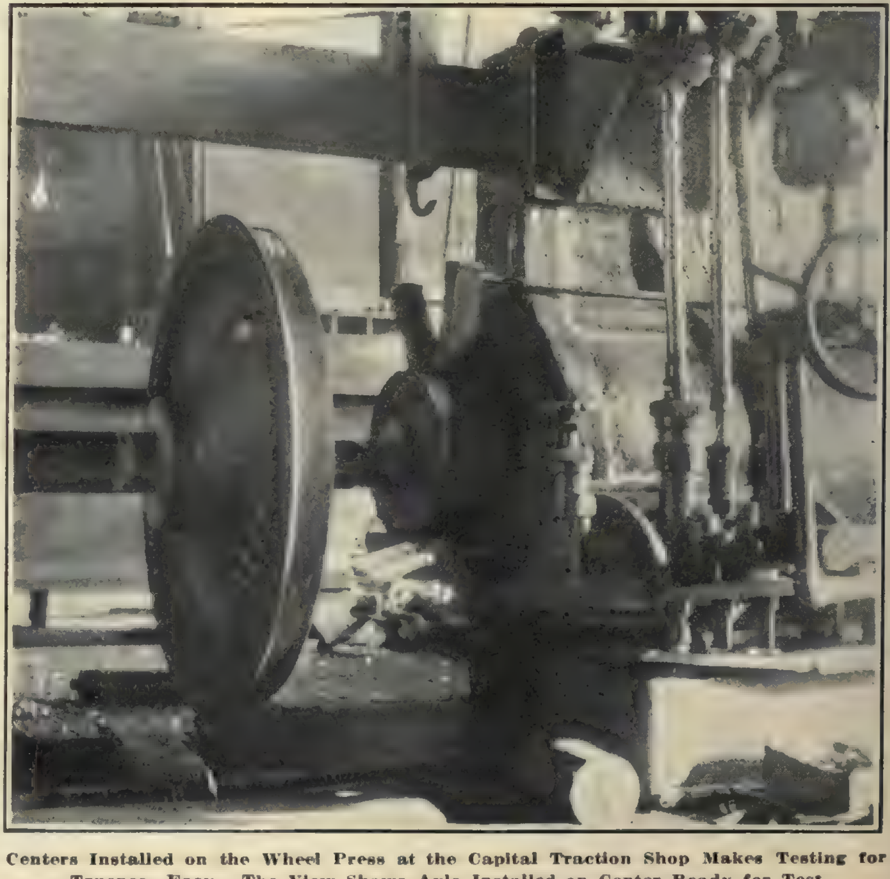
The face of the collar adjacent to the axle bearing is bored out ⅜ in. deep and of a diameter to permit the entrance of the axle-bearing flange. A ¼-in. fiber washer between the face of the axle-bearing flange and the bottom of the recess minimizes the flange wear. With this arrangement the clearance between the fiber washer and the axle-bearing flange face is underneath the recess wall and is protected from the ready entrance of dirt or brakeshoe dust. It is claimed that this feature has doubled the life of the bearing flange.

These adjustable dust-deflecting axle collars are rapidly replacing the small non-adjustable, non-dust deflecting axle collars furnished with the motors. The clamping bolts of the old type of collar worked loose very frequently and permitted the motor to shift and very often caused considerable damage. Not being provided with a recess space dirt and brakeshoe dust could enter the space between the flange face and the collar recess base, causing excessive wear with resulting short bearing life.

Axles Tested for Trueness on Wheel Press

CONSIDERABLE trouble and delay was experienced in the shop of the Capital Traction Company, Washington, D. C., in testing axles for trueness after wheels had been pressed on, until W. H. McCarty, master mechanic, devised a method for doing this testing in the wheel press. This consisted of installing an axle center on the wheel-press ram housing and another on the tailstock casting. After the wheels are pressed on, the completed axle is moved to these centers, revolved, and observations made as to trueness. Where defects are detected the axle is then removed and transported to the axle-straightening machine.

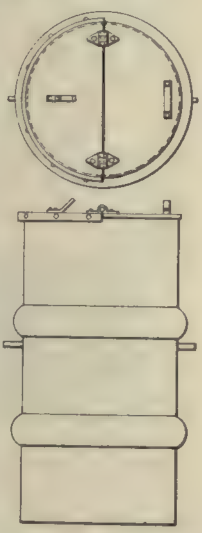
Prior to the installation of these centers it had been the practice to lift the axle from the wheel press and transport it across the shop to the wheel lathe, where the necessary tests were made. Every axle was tested in this manner and the loss of time at the end of a year for transportation alone amounted to a con-



Centers Installed on the Wheel Press at the Capital Traction Shop Makes Testing for Trueness Easy. The View Shows Axle Installed on Center Ready for Test siderable number of hours. Often the lathe was engaged on other work and the axle could not be tested immediately, so that there was a still further delay. This system has afforded a means of immediate testing at the press and has resulted in increasing production by eliminating unnecessary handling and shop delays.

Refuse Container Made from Gear Grease Drum

SUBSTANTIAL and safe shop waste containers for inflammable refuse have been made from empty gear grease drums by the Interborough Rapid Transit Company. In many cases these drums are not accepted for credit by the manufacturers. They have therefore been converted to this use at small expense. One head of the drum is completely removed and in its place is installed a self-closing cover with necessary hinges, stop and handles as shown in the accompanying sketch.



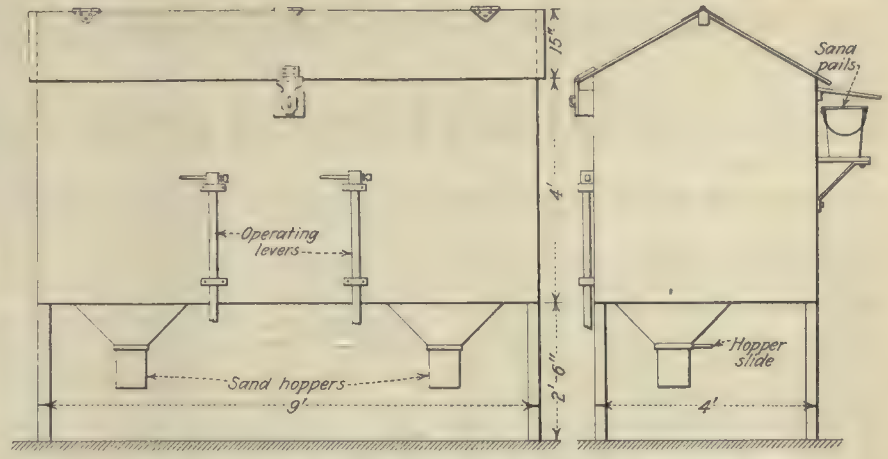
Refuse Container Made from Empty Gear Grease Drum

Handy Sand Storage Bins Prevent Failures

WATERPROOF sand bins located conveniently in the inspection barn and storage barn as well as outside of the buildings of the Virginia Electric & Power Company, Richmond, Va., insure a ready supply of dry sand for the carhouse organization or the motormen of passing service cars for the car sand boxes. These bins were designed and constructed in the company's shops, under the supervision of the master mechanic, W. J. Hicks. They are of pitched roof design and are built with 2-in. x 4-in. oak framing, to which is spiked 1-in. yellow pine planking. Two-ply tar paper covering the sides and top of these bins thoroughly protects the sand from rain and moisture. One side of the pitched roof is hinged for filling. These bins have a capacity of 5 cu.yd. of dry sand. Two Brill sand hoppers located in the bottom of each bin with hand levers on the front at a convenient height from the ground permit of quick and easy withdrawal of the sand. These levers, connected to the sand hopper slides through a series of bell cranks and rods, open the hopper slides. They are returned to a closed position by means of heavy coil springs. A shelf on the back of each bin, protected from the weather by a slanting roof, provides storage place for one or more pails for carrying the sand to the car sand boxes.

These bins are inspected and filled twice a day by the maintenance of way organization.

Since the installation, the number of cars reported for empty sand boxes has been considerably reduced. A marked decrease has resulted in sand box failures, ordinarily caused by partial filling.



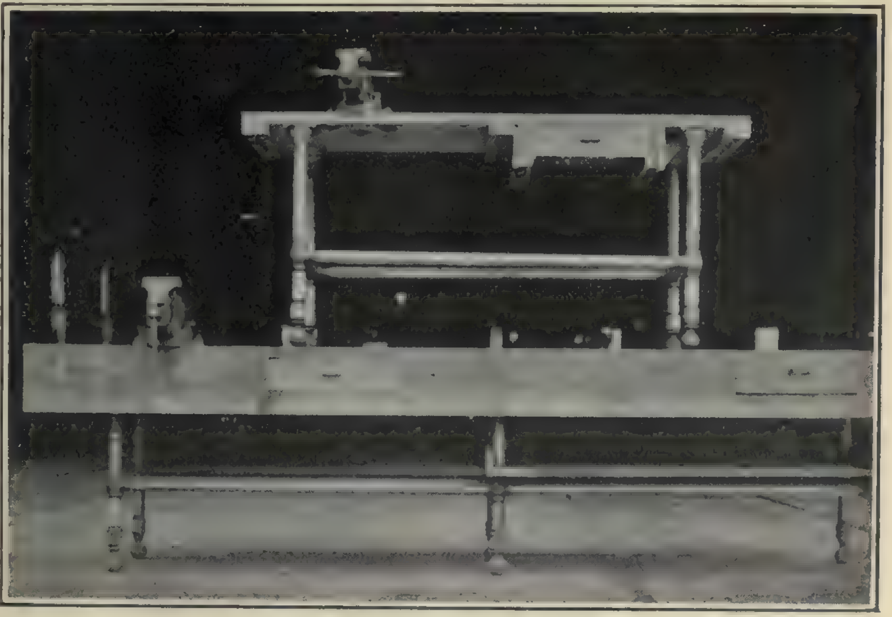
General Appearance of Sand Bins Used by Virginia Electric & Power Company at Richmond

> *Modernize, as you* can *well* afFORD *to* retire *your* "Tin Lizzie" *car equipments.*

New Workbenches Improve Working Conditions

BELIEVING that the old workbenches in the shop of the North Carolina Public Service Company, Greensboro, N. C., had served their usefulness and were a detriment, Master Mechanic Seawell scrapped them and designed and built up-to-date benches.

Each department of the shop is now equipped with one or more



Neat and Rugged Pipe-Frame Benches Used in the Shop of the North Carolina Public Service Company benches with pipe framework of a design similar to those shown in the accompanying illustration. The framework is made of 1½-in. galvanized iron pipe threaded carefully and screwed into extra heavy long, round-bodied tees, crosses and flanges.

The various fittings are provided with right and left-hand threads to permit of complete assembly without the use of running threads or right and left-hand couplings. The assembled framework is strong and attractive in appearance. The top of each bench is made of 1½-in. oak planks assembled upon and fastened securely to cross members of 2-in. x 4-in. oak.

Spacious oak drawers provide for the storage of materials and tools. An iron ball foot is screwed into the bottom of each leg.

The bench top is mounted upon the cup-shaped flanges on the end of each leg and is held in position by means of through bolts, the heads of which are installed flush with the bench surface. Each bench is provided with a 6-in. vise.

These benches are all 36 in. wide and the heights vary from 34 in. to 40 in. and the length from 6 ft. to 12 ft., depending on the location and the character of work to be performed.

New Equipment Available

Portable Chain Saw

MEETING a demand for a mechanical portable saw to cut lumber and timber at the job, the Reed-Prentice Corporation, Worcester, Mass., is marketing the Wolf portable chain saw. The equipment is provided with a 24-in. saw and is supplied with reversing and foot-controlled switches so that it can be handled by one man.

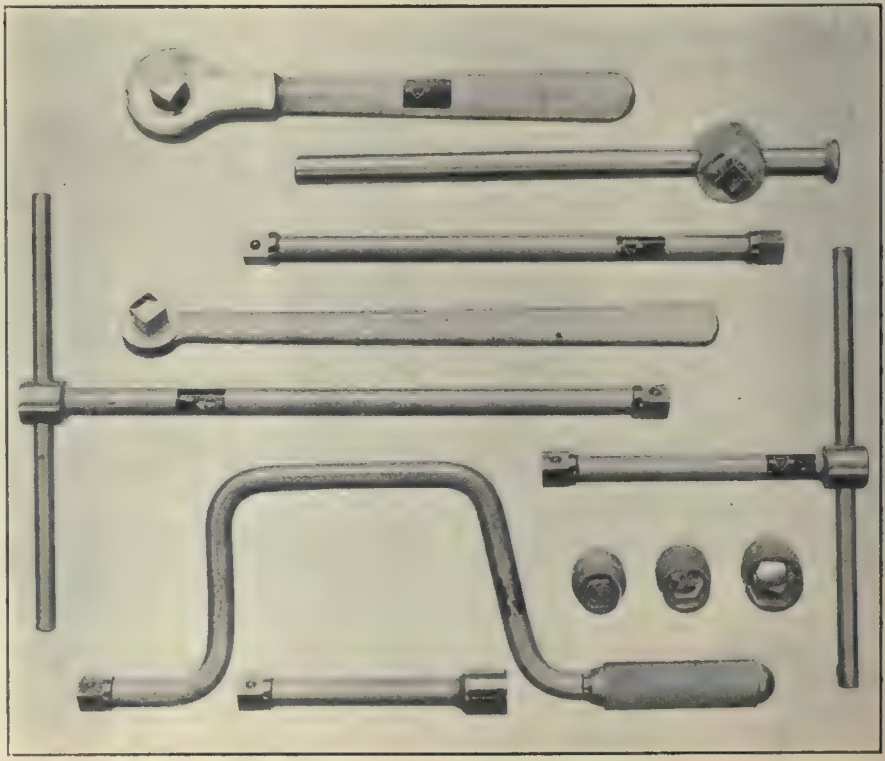
The saw blade is made of two pieces of selected saw steel with spacers to form a groove in which the diameter teeth travel. Provision is made for an oiling groove and reservoir in the spacers. Gears are of steel and the gear case is packed with heavy grease. All shafts are hardened and ground and run in ball bearings. The machine weighs 83 lb. and is driven by a 1½-hp. motor, this being supplied in any voltage desired.

Chrome Vanadium Socket Wrenches

DETACHABLE head socket wrenches made of CV chrome vanadium steel are among the new products of the Bonney Forge & Tool Works of Allentown, Pa. The sockets are forged from solid bar stock and should not be confused with sockets cut from bar stock or stamped from tubing. The manufacturer claims that the forging process retains unbroken the grain of the steel and this process plus the use of chrome vanadium makes an exceedingly strong, detachable head, socket wrench. This exceptional strength also makes it possible to manufacture these wrenches with very thin walls, which proves of decided advantage for close corner work.

In addition to the line of sockets, this company has also developed a complete assortment of handles, which are forged from chrome vanadium steel. These include solid offset handles, ratchet offset handles with reversible lugs, "T" handles in various lengths, sliding "T" handles, ball bearing "brace type" handles of various lengths and extension bars for reaching inaccessible places.

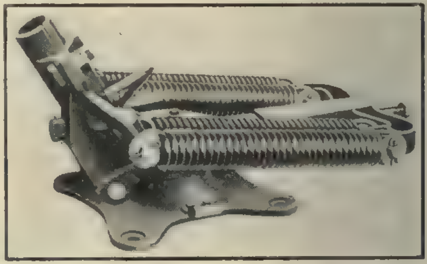
A ½-in. square lug, which has become practically standard for all detachable head socket wrenches, is used by the Bonney Forge & Tool Works. This makes it possible to use the new socket wrenches in connection with any detachable head socket wrenches which a mechanic may already have. Adapters are also provided so that the handles may be used for the very large size sockets, many of which use a ⅝ in. square.



Line of Chrome Vanadium Sockets and Detachable Handles

Sensitive, Lightweight Trolley Base

BY PROVIDING parallel double-race bearings a trolley base which is extremely sensitive, light in weight and free from friction has resulted. This is being introduced by the General Electric Company, Schenectady, N. Y., and designated as type US-20. The bearings, of tapered roller construction, cause pressures to be spread evenly over the entire bearing surface, as the pressure at the top and bottom of the swivel is practically perpendicular to the roller. The base hangs on the roller bearings, giving the swivel greater freedom and reducing wear.



New Lightweight Trolley Base

Association News & Discussions

Optimism Pervades C.E.R.A. Meeting

Necessity of Replacing Old and Heavy Cars by Up-to-Date Equipment Emphasized—Marked Success Has Attended Modernization of Many Properties in Central Territory

STILL another milestone in the recovery of the electric railway lines in Michigan, Indiana, Ohio and Kentucky was marked by the annual meeting of the Central Electric Railway Association held at the Commodore Perry Hotel in Toledo on Feb. 3 and 4. Growing passenger earnings were reported by many of those in attendance. As a result, a distinct note of enthusism and optimism pervaded the meetings and the discussions taking place. The value of improved equipment and facilities in winning reduced costs, increased business and a friendly public was pointed out and emphasized over and over again by those who had successfully turned the corner toward decidedly improved conditions, by the application of modern merchandising ideas to the transportation business.

PRESIDENT JEFFRIES SOUNDS KEYNOTE

"Notwithstanding the continued competition of rapidly growing numbers of automobiles, owners and managers of electric railways feel more optimistic than they did last year," said President G. K. Jefferies in his opening remarks. He attributed some of the improved traffic experienced by railways to the increased difficulties attending the use of automobiles together with a growing realization by the public of the cost of using automobiles for ordinary transportation purposes. But he also pointed out that the convenience of the private automobile is such that improved facilities and higher class service on the electric railway lines are necessary to win any appreciable part of the increased demand for transportation created by the coming of the automotive vehicle. "This," he said, "can only be given by a line in first-class physical condition. Some electric railways have good equipment but a roadbed in poor condition. Others have first-class track but old, out-of-date cars. Very few have both track and equipment of high grade."

Mr. Jeffries called attention, however, to the fact that those properties that have put both their track and cars in good condition, and that have taken advantage of the service improvements which this makes possible, are the ones that have been successful in building up a profitable business. Since the alternative of using an automobile is always present, people will not put up with discomforts and inconveniences to which they were formerly accustomed.

"The traveling public must be put in such a state of mind by improved equipment and facilities," said the speaker, "that they will look forward to a trip over electric lines with pleasurable anticipation instead of regarding it as a necessary evil to be endured. The day is gone when a line of rails, some vehicles with wheels under them and motive power, but without any of the refinements demanded by the public, can long exist; the competition by more attractive agencies is too great, regardless of the cost."

Combined with these material things which can be seen and examined, the speaker held that the attitude of employees toward their work and their company and the reflection of this attitude in their dealings with the public represent factors which spell ultimate success or failure for a given operation. Here again he called attention to the important part played by the condition of the physical property. If the employee has pride in his company and in its service, he can be trained much more easily and successfully as a salesman of its service.

IMPROVED EQUIPMENT IS PAYING INVESTMENT

In a symposium on the results accomplished by new rolling stock, railway managers who have had sufficient experience with improved equipment on their properties testified to the permanency of the improvements effected. George MacLeod, vice-president and general manager Buffalo & Erie Railway, opened this part of the program. From the experience on his property Mr. MacLeod held that there is little question but that more comfort and better appearance in equipment will give increased revenue. Here, however, the speaker insisted that operating income rather than revenue is the all-important figure to be considered. When the question of equipment is approached from this angle, the type of car used by a given property becomes one of the most important factors that determine the final result accomplished.

Taking the experience of the Buffalo & Erie property specifically, Mr. MacLeod cited the results accomplished by the complete replacement of former heavy equipment with new light-weight, high-speed interurban cars operated by one man, and that weigh only 19 tons. Combination air-magnetic brakes permit quick stops to be made despite the high operating speed. These cars were first placed in operation in February, 1925, and have since shown a reduction of 50 per cent in power costs in comparison with the old equipment. An attractive saving in track and roadway maintenance was made, tie spacing was increased and at the same time a longer life of the tie structure is expected than was formerly obtained with closer spacing under the old equipment. It is also expected that rail and special work life will be doubled as the result of the lighter cars. Equipment maintenance costs have been reduced 50 per cent. It costs approximately one-third as much to rewind armatures and fields on this car as on the old equipment.

For the twelve months of 1925, as compared with 1924, there was an increase in passenger revenue of 7.5 per cent. Despite an increase in car-miles operated of 14.4 per cent, operating costs were 12.8 per cent less than in 1924. This represented an actual decrease in car-mile cost of 23.3 per cent. Due to very unfavorable weather conditions in 1926, revenues during the summer were less than in 1925. The riding for the year, however, was 3.8 per cent higher than in 1924, and the months of November and December showed increases of 4.2 per cent and 5.2 per cent respectively over the corresponding months of 1925.

L. J. DeLamarter, vice-president and general manager Grand Rapids Railway, testified to the permanency of the results accomplished there with new equipment, in a written discussion that was read by J. W. Knecht, general superintendent of the property. "After seven months of operation of our new cars I am as enthusiastic as ever over them and over both their tangible and intangible value to the property," said Mr. DeLamarter. Figures were cited to support the statement that the new cars have brought actual revenue increases. These show that during each month since the Grand Rapids rail coaches were placed in service the proportion of increase in passenger revenue on the three lines so equipped has been considerably higher than the increase shown on the balance of the lines in the city. During the seven-month period from June to December, 1926, passenger revenue increased 3.21 per cent over the corresponding period in 1925 on the three lines upon which the new coaches are operated, while the passenger revenue for the same period on all other lines increased only 1.91 per cent.

BRINGING BACK PATRONAGE TO THE INTERSTATE

L. M. Brown, general superintendent Interstate Public Service Company, described the equipment improvements that have been made on that property during recent years. Since 1920 there had been a gradual decrease in total passenger revenue on this property each year from the preceding year, he said. In 1926 the condition changed, with a substantial increase which brought passenger revenue to only 8 per cent below the figure for 1920. Since the installation of parlor-buffet and sleeping car service a check of the longer-haul travel — that is, passengers traveling 100 miles or more—shows an increase of 40 per cent in this class of business. This has not been erratic but has consisted of a steady, constant growth. It is attributed very largely to the character of the equipment operated and the consequent improvements in service that have been made. The speaker expressed the opinion that new cars alone will not bring permanent increases in revenue; that satisfactory results can only be obtained by combining with new equipment such improvements in service as will meet the demands of the present-day traveling public.

W. R. Power, general manager Appalachian Electric Power Company, expressed his thoughts on the subject of increasing passenger revenue in a letter which was read by H. L. Brown, chairman of the program committee. R. N. Graham, manager of railways Pennsylvania-Ohio Electric Company, talked extemporaneously on the results of Youngstown's experience with modernization and with bus operation. Mr. Graham held that there is no mysterious rubber urge in transportation. He cited results obtained on parallel car and bus lines serving the same territory to show that careful analysis of the transportation situation under each specific combination of circumstances encountered is necessary for intelligent appraisal of the measures which will bring best results from a financial standpoint.

INDUSTRY PAYING FOR 12,000 CARS

The electric railway industry is paying annually, in the form of excessive operating costs, for 12,000 new cars which it is not receiving, according to Charles Gordon, editor ELECTRIC RAILWAY JOURNAL. Mr. Gordon again showed lantern slides which have been presented before other sectional association meetings to illustrate the heavy cost which the industry is paying for the operation of heavy and obsolete equipment.

Further discussion of the present car situation in the industry, and of the importance of equipment improvements, was included in papers prepared by J. H. Alexander, president Cleveland Railway, and M. B. Lambert, transportation sales manager Westinghouse Electric & Manufacturing Company. Mr. Alexander's paper was read by R. W. Emerson, vice-president Cleveland Railway. He urged the importance to the industry of improvements in cars and car equipment and called on all manufacturers and operators as well to do their part in helping to make the car exhibit at the Cleveland convention next fall a real inspiration to the entire industry. Another point which was strongly stressed was the value of the work which has been done by the American Association committees on essential features of modern cars and on unification of car design. H. H. Adams, who has been chairman of the latter committee for a number of years, extended an invitation to any company faced with the problem of selecting the proper equipment for a given service to confer with the committee.

An abstract of Mr. Lambert's discussion of the car situation is printed elsewhere in this issue. This complete session on the subject of rail equipment was followed by an afternoon devoted to the bus. Walter Jackson, railway and bus consultant, New York, took as his subject the proper use of buses by electric railways. T. W. Noonan, general manager Pittsburgh Motor Coach Company, discussed the new 25-cent express service which has been developed in that city to attract automobile riders who formerly used private cars in daily travel. An abstract of his paper is printed elsewhere in this issue.

Mr. Jackson cited the experience of more than fifty electric railway properties which have operated buses for some time in cities ranging in size from 25,000 population and less to metropolitan conditions. In practically all such situations, he found that the operation of buses as street cars on rubber tires, while in many instances serving as a stop-loss measure to eliminate heavy track and paving construction and reconstruction charges, fails to show any really substantial revenue building possibilities. The speaker held that the most attractive field offered for the extension of bus operations at a profit, particularly in large cities, is in the direction of a quasi-rapid transit service to places more than 4 or 5 miles from the business district. He held that success in such operations demands a rate of fare at least double that of the car fare, with a character of service so superior that it will draw largely from the ranks of persons using personal motor cars, with whom expense is secondary to character of service. To this end short headways, speedy operation, seating comfort, adequate lighting and ventilation and other conveniences are important. The need for high schedule speeds, for the elimination of stops and for worming in and out of congested traffic dictates, according to Mr. Jackson, a small vehicle of comparatively limited seating capacity and limited width.

An unusual feature of the program was a general conference of operating executives devoted to the subject of building more profitable business for the interurbans. In this meeting, which, in the absence of J. P. Barnes, was presided over by W. H. Sawyer, president American Electric Railway Association, a high pitch of enthusiasm pervaded the discussion. Various speakers from properties which have already accomplished notable results in recovering traffic formerly lost to automobiles, and in generally improving their financial showing, testified to the wisdom of spending money for improvement of facilities and modernization of operation. Mr. Sawyer was also the principal speaker at a dinner on Thursday evening. An abstract of his remarks is printed elsewhere in this issue.

The subject of maintenance occupied most of the final session on Friday. Papers by H. S. Williams, assistant superintendent of equipment Department of Street Railways, Detroit, and by W. T. Rossell, general manager Pittsburgh Railways, will appear in abstract in a later issue. Another paper of general interest on the experiences of the Indiana Service Corporation in reshaping its financial structure prepared by R. M. Feustel was read by H. E. Vordermark.

M. Ackerman, general manager Lake Shore Electric Railway, Cleveland, Ohio, was elected president for the ensuing year.

Financial Reorganization Saved the Original Investment*

By ROBERT M. FEUSTEL
President Indiana Service Corporation

THE chairman of your program committee is responsible for the thought that the plan of the Fort Wayne reorganization, consummated in 1920, might be of some interest to association members. To those actually engaged on the plan, the path seemed very clear, not because there was any unusual foresight used but because there was only one way out. It was the case of a fair-sized utility finding itself broke, with no banking and very meager merchandise credit. Like all utilities, there was some reasonably fixed lower limit to gross earnings, and to find this limit, pay merchandise creditors and start anew on what history had taught was the fair earnings to be expected was the rather simple task. The only difficulty was to persuade bondholders and general creditors that you might settle these problems more promptly and at less cost out of court.

The Fort Wayne & Northern Indiana Traction Company was the result of a reorganization in 1911 of the properties of the Fort Wayne & Wabash Valley Traction Company. This predecessor company had been the result of consolidations made in 1903 of the Fort Wayne city line, light and power properties in Fort Wayne and a 114-mile interurban line from Fort Wayne to LaFayette. By 1917 about 60 miles of additional interurban lines had been built and light and power business developed in 25 small communities adjacent to the interurban lines.

COMMON STOCK ISSUED AS BONUS

The gross revenue in 1917 was, in round figures, $3,000,000. The actual investment in physical property was $14,000,000, of which $10,000,000 was in city and interurban lines and $4,000,000 in light and power property.

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*Paper presented before Central Electric Railway Association, Toledo, Ohio, Feb. 4, 1927.

Against this property were outstanding $9,000,000 of underlying bonds of four issues and $3,000,000 of Fort Wayne & Northern Indiana first mortgage and collateral trust issues. In addition, there were $2,500,000 of preferred stock and $4,000,000 of common stock. The total was $12,000,000 bonds and notes and $6,500,000 of preferred and common stock, making a total of $18,500,000 of securities against $14,000,000 of cash actually invested in the properties. I suppose that some years ago it would have been rank heresy for a utility operator to have admitted that more face value of securities were outstanding than there was actual money invested in physical property. With the considerable experience that the writer has had in investigating the history of utility properties for utility commissions it has always seemed to him that the utility operators had failed to make the most before utility commissions of the very natural and logical history of the growth of their financial structures.

The property under discussion had been financed in the commercial days of unrestricted competition when limited franchises in cities and expensive private right-of-way lines in the rural districts afforded all the investor had in the way of protection of his investment. City councils and county boards were the political wasters and they were changing at least every four years. The franchises, many of which contained burdensome provisions, were usually good only for the life of the bonds; that is, 25 to 30 years. For traction properties the automobile had not come into real commercial use and the interurban gave promise of being a splendid field for investment.

One of the common methods in the past for providing construction money for the traction systems was to sell a $1,000 bond, $1,000 of preferred and $1,000 to $2,000 of par value common stock for, say, $2,500 to $3,500. Just what cost to assign to the different classes of securities in a transaction such as this depended upon the opinion of the purchaser.

A certain amount of the common stock was, of course, taken by the promoters, and some was, no doubt, used in obtaining help from local influential citizens in obtaining necessary grants, rights-of-way and franchises. The resulting financial structure was that the bonds and preferred stock at par usually represented the cash in the property and the common stock represented about 25 per cent additional for promotion and cost of establishing the business. If the enterprise was successful the common stock would be made good; if not, even the bonds and preferred stock might become speculative.

WAS RESULT OF CONDITIONS THAT EXISTED

As stated, it seems to the writer that such a financial structure was a perfectly logical outcome of the highly competitive conditions under which those early traction utilities were built and the promoters were well entitled to any profits they could make in gathering so much money into the development of the new and still speculative utility field. Within a period of fifteen years poor guesses as to choice of territory in some cases and the development of the automobile in all cases changed what was a perfectly legitimate business enterprise into a task of intelligent salvaging.

COMING MEETINGS
OF
Electric Railway and Allied Associations

Feb. 18—**New York Railroad Club, meeting, Engineering Societies Building, New York City, 8 p.m.**

Feb. 18-19—**Kentucky Association of Public Utilities, annual convention, Brown Hotel, Louisville, Ky.**

March 4—**American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p.m.**

April 26-29—**Southwestern Public Service Association, convention, New Orleans, La.**

July 27-29—**Association of Equipment Men, Southern Properties, 12th semi-annual meeting, Atlanta, Ga.**

Oct. 3-7—**American Electric Railway Association, annual convention and exhibit, Public Auditorium, Cleveland, Ohio.**

The Fort Wayne & Northern Indiana securities structure was the result of such financing, and it is perfectly obvious that a utility property bonded up to 85 to 90 per cent of its construction cost must earn a good return from the start else the sheriff will not be far in the offing. This property, like others of a like character, would no doubt have come through well if it had not been for the miraculous development of the private automobile. A safe margin for bond interest could not be earned, and yet new money was needed for city lines, light and power and even for interurban improvements and extensions. Depreciation, a rather unwelcome and reasonably unknown visitor, also came in and demanded food from the operating revenues. The solution was comparatively simple; i.e., save what could be salvaged of the original cash investment and let the stockholder go by the board.

It was such a condition that confronted the Fort Wayne & Northern Indiana properties at the beginning of 1917, just ten years ago. On legal equities the bondholders would, of course, come first. It was indeed fortunate that the stocks and bonds had been sold in joint blocks, because if the bondholder could be saved it meant that the stockholder might lose nothing much except what had been his anticipated profits. This, of course, was not literally true in all cases, because some of the securities had changed hands. It was true in the main, however.

The most urgent need was money for rehabilitation so that better service and then possibly increased revenues might result. It was at this point that the only real unusual feature of the reorganization occurred. A default was started in 1917 on $11,500,000 of bonds, and interest was paid on only $500,000 of real underlying bonds and, of course, principal and interest on car trust certificates. With some $500,000 owing to supply dealers, it was explained to the bondholders that future necessary credit made it desirable that these merchandise creditors be paid. A receivership might start rather expensive litigation and would surely hamper the improvement of the property from earnings, as court orders for improvements would be difficult to obtain.

Because the operators were too innocent to know that you can not default for such a length of time without a receivership, it was tried, and for 2½ years such default was made until the company was ready for a short voluntary receivership and reorganization. During this time the merchandise creditors were paid off and almost a million dollars was expended in new cars and improved power facilities so that net earnings might be improved. This task was also made much easier because it occurred during the difficult war period when security holders and creditors were busy at many other tasks.

NEW FINANCIAL PLAN SAVED ORIGINAL INVESTMENT

The new financial plan was simple indeed, even though it did require much co-operative work among the several sets of bondholders. The first lien bonds were cut from $9,000,000 to $4,700,000. The only slip in the plan came in the issue of $4,800,000 of income bonds as the next set of securities. While the interest on these bonds need not be paid unless earned and is not cumulative, for future financing it would have been better to have had a first preferred stock. An issue of $2,159,000 of 7 per cent non-cumulative preferred and $2,159,000 of common stock completed the new financial structure. This might appear to be a rather meager set of securities to exchange for first mortgage bonds and preferred stock, all of which had formerly meant real cash investment. The new securities, however, did equal in face value all of the cash which had been put into the property, including the forgone interests for the three years of default.

With the net earnings during the default period put into betterments and the generally improved business conditions after the war, the task was made easy. Some financing was done by first mortgage bonds, as that issue now represented only 35 to 40 per cent of the investment. The income bonds paid 3, 4, 5 and 6 per cent for the succeeding years after 1920 and have been on a sound basis ever since. Light and power and city lines earnings increased sufficiently to make possible dividends on the preferred and common stock. In other words, there were fair earnings available for return on all of the cash actually invested in the property. Before such dividends were actually paid on the common and preferred stock the properties were sold to our operating syndicate, where the preferred was converted into common stock to make possible the issuance of new preferred for improvements to be sold on a customer-ownership plan.

There is nothing at all remarkable

about the plan we have outlined except that the new securities did represent all the cash in the properties at face value and were so arranged that future financing would be accomplished, and if earnings would have been low the sheriff was not so near by. The holders of the common and preferred stocks received an average above par for their holdings at the sale and the first mortgage 5 per cent bonds and the 6 per cent income bonds are now selling for around 95 in the open market.

Congestion Relief with de Luxe Coaches*

By T. W. Noonan

General Manager Pittsburgh Motor Coach Company

MILLIONS of dollars are being spent for policemen, signal systems, street alterations and what not to relieve traffic congestion. Yet every change toward expediting traffic is soon offset by the increase in the number of personal automobiles. We cannot sweep back the ocean of personal cars by condemning their wasteful use of street space, whether running or parked; nor by finding fault with their owners because they choose to roll their own, regardless of expense. We have no right to call for the removal of the personal car unless we can offer something of equal or greater value in its place.

The New Coaches Seat Nineteen Persons in Comfort. Because of Their Size They Are Easier to Handle in Traffic than the Large Buses Used Previously

The personal car has developed a desire for faster and more luxurious transportation than can possibly be given by a low-fare electric railway service. That desire has become so set with many automobilists that they are willing to subject themselves to heavy expense and much annoyance rather than return to what they deem lower-grade transportation.

Buses with narrow seats, skimped aisles, insufficient lighting, poor ventilation and poor springs are surely not the vehicles with which we can draw the autoists and so work toward the only practical solution of congestion, to wit, reduce the number of vehicles which make inefficient use of their highway space privileges. Such operation stands even less chance of doing good when an inferior type of mass transport vehicle is accompanied by headways longer and fares higher than prevalent electric railway standards.

In making the foregoing assertions, I am sticking to the experience of the Pittsburgh Motor Coach Company. To put the matter in a nutshell: We have found that long-headway buses do not pay and that short-headway de luxe coaches do pay. In both cases, traffic drawn from the associated Pittsburgh Railways was a negligible factor because the coach fare is 25 cents while the street railway schedule is 10 cents cash, 8⅓ cents token and $1.50 weekly pass within the same area.

Following the acquirement from an independent operator of a line joining the business and amusement centers of Pittsburgh and East Liberty, on Aug. 14, 1925, we originated a 5.7-mile route from downtown Pittsburgh to Squirrel Hill, a high-class residence district lying just beyond Schenley Park. For this service we installed 29 and 25-seat buses. On May 24, 1926, we originated a 6.6-mile route to Point Breeze, another fine residence district. The vehicles put on were 29 seaters.

Both the Squirrel Hill and Point Breeze routes make use of 2 miles of boulevard emanating from downtown Pitsburgh. The Squirrel Hill route also makes use of Schenley Park and, in general, is not near trolley territory. The Point Breeze route, after leaving the boulevard, is on tracked streets for a good part of the way.

Increase in Business of 20 to 58 Per Cent

The Point Breeze route is of greatest interest because it covers results from changes in both equipment and service, whereas the other lines are still being operated with buses instead of de luxe coaches.

Beginning Dec. 6, 1926, we changed Point Breeze from 29-seat buses to 19-seat coaches. These coaches have a wheelbase of only 210 in. compared with the 255-in. wheelbase of some of the others. They are therefore much easier to negotiate in downtown streets. The over-all length is also only 24½ ft. against the 28½ ft. length of the older vehicle. The reduction of over-all width from 90 in. to 81⅝ in. has been found of substantial value in avoiding accidents and in getting by other vehicles.

Because of the better clearance conditions and smaller capacity, we were able to cut the running time from 38 minutes to 30 minutes. In addition to making this time saving for the patron, we save him a possible ten minutes in the rush hours by shortening the headways from twenty minutes to ten minutes, and a possible further saving of eight minutes in the non-rush hours by shortening the headway from twenty minutes to twelve minutes. Business increased so rapidly that the six coaches soon were unable to cope with it. So we now throw in two of the 29 seaters to help the morning peak and three 29 seaters between 4 p.m. and 6 p.m.

The total increase in vehicle-miles offered is about 50 per cent. The increase in revenue is about 58 per cent. This is in comparison with the November weeks immediately preceding, as this route was not in operation in December, 1925. Probably some of this increase was due to the more wintry weather and Christmas shopping stimulation, but it will be seen from results on the other routes that the new type of equipment and shorter headways were responsible for the greater part of the gain.

Under the first operation, November showed earnings of $170 a day or 29 cents per mile, but costs were 32 cents per mile.

Under the new operation, December showed earnings of $301 a day. Earnings were 32.3 cents per mile, but costs only 26 cents per mile.

The table on page 299 shows the details of earnings and services in two weeks preceding the change and the first four weeks thereof.

Naturally enough, there was no large increase in earnings per vehicle-mile in view of the increase in number of miles offered and the reduction of seats per vehicle. The important point is that a loss of 3 cents per bus-mile has been turned into a profit of 4 to 5 cents per coach-mile.

Not the least interesting feature of the new service is the effect it has had on night travel. Even the earnings per vehicle-mile have been increased by 50 per cent. We cannot help concluding that this large increase in night travel, when there are no parking restrictions to hamper personal driving, must be due to having a service attractive enough to make the theater-going autoist keep his machine in the garage.

On the Squirrel Hill route we merely changed our service standards beginning on Dec. 6, 1926. Operation for the present continues exclusively with 29-seat single-deck buses. However, the peak headways were shortened from twelve minutes to ten minutes. Off-peak headways remained at fifteen minutes. The terminal-to-terminal time is 30 minutes, which is equivalent to a schedule speed of 11.4 m.p.h. It should be explained here that our layovers on

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*Abstract of a paper presented before the Central Electric Railway Association, Toledo, Ohio, Feb. 3, 1927.

RECORD OF EARNINGS FOR SIX WEEKS BEGINNING WITH NOV. 22

Week begun	Miles	Total Revenue	Revenue, Cents Per Mile All Day	Revenue, Cents Per Mile 7 P.M. to 11 30 P.M.
Nov. 22	3,507	$1,011	28.8	13.4
Nov. 29	3,530	1,108	31.4	14.2
Dec. 6	5,562	1,668	30.0	20.8
Dec. 13	5,554	1,829	32.9	25.6
Dec. 20*	4,753	1,556	32.7	20.5
Dec. 27*	4,836	1,582	32.7	19.4

*Five-day weeks.

all routes at the downtown end are no longer than necessary to interchange passengers, and they are never more than two minutes at the uptown end. The cost of operating these 29-seat buses is 34 cents per mile. They earned 46 cents per mile in December, 1926, an increase of 20 per cent over December, 1925.

Counting from the beginning of independent operation in November, 1916, the East Liberty route had been in operation ten years, so it might have been assumed that the market for 25-cent riding was pretty well stabilized. Our experience, on the contrary, proves that we were far from saturation point, although we still have no de luxe coaches on this route.

The equipment change on this route was to eliminate the double-deck bus completely. It was not only unsuitable for the curves and hills of this line, but so unpopular as a carrier that it did not earn any more per mile than the 25 and 29-seat units. The theoretical seating capacity of these double-deckers was 52. Their actual capacity for the greater part of the year was 22—the number of seats on the lower deck. Unlike the operation on Fifth Avenue, New York, or the Lake Shore, Chicago, there is no large number of sightseeing objectives to draw passengers to the upper deck. A special check made in the still balmy weather of September, 1926, showed that the upper deck was little used even then.

The cost of running the double-deckers was 42 cents per mile. The cost of running the single-deckers over the same route is 32 cents per mile. We did not alter the headways from the six-minute peak and the eight-minute off-peak, except that on Saturdays from 12 o'clock noon headways are on a five-minute basis. Since the effective seating capacity of the double-deckers was only 22, we really increased the number of seats available by confining ourselves to the 25 and 29-seat single-deckers. The running time between terminals is 26 minutes, which corresponds to a schedule speed of 11½ m.p.h. Earnings in December, 1926, were 54 cents per mile, which was 20 per cent more than in December, 1925.

RAISING THE STANDARD IN OTHER WAYS

In our endeavor to give the autoist something good enough to tempt him from the use of personal cars during busy hours, we have made several changes in other directions. In body color, we are changing from a yellow to a rich and dignified combination of dark gray below and sapphire green above the belt line.

In seating, the scant dimensions and rather stiff upholstery of the buses have been succeeded by twin chairs on one side of a 16½-in. aisle and single instead of double seats on the other side, all spaced on 30 in. centers for real knee-room. These chairs are upholstered in air-cushioned Spanish leather. The single chairs are 23 in. wide over the arm rests, the double chairs 35 in. A set of air-cushion seats extends across the back of the coach.

Appreciated features are the mirrors on the posts between the extra long windows and the eight 21-cp. dome lights, which eliminate former complaints about light too dim for reading. The better riding quality of the coaches also makes it easier to "read as you ride, while we do the driving."

Panel Attached to Lamp Standard Shows Where Coaches Stop in the Business District

In fare collection, we have tried to avoid the eyesores and earsores of register rods, cords and bells. The passenger simply drops his fare into a locked box finished to correspond to the interior trim of the coach. There are no cords or rods to irk the eye. Only an inconspicuous cord for signaling the operator is carried along the side of the coach within convenient reach of the rider. We display no printed matter whatsoever.

The bonus and free uniform features given originally in addition to a wage scale of 50 to 55 cents an hour were eliminated in favor of a wage scale corresponding to that of the Pittsburgh Railways.

We duplicated the 1½-cent increase of the railway, made on Jan. 1, so that the present scale is 61½ cents for the first three months; 66½ cents the next nine months and 68½ cents after the first twelve months. The first result has been a complete absence of turnovers since Nov. 1. A second result has been a decrease of 35 per cent in accidents per vehicle-mile.

Our first publicity for the improved Point Breeze service was to run the first two coaches in with the others, but the chauffeurs gave each patron a card stating that a full service with coaches of the same design would be inaugurated on Dec. 6; also that the new schedule would be handed out with them. On Dec. 2 we mailed a letter to 3,200 householders in the Point Breeze area, the names being selected from the customer list of the associated Duquesne Light Company.

It is hardly necessary to add that news of the de luxe coaches on the Point Breeze route spread quickly to the customers on the Squirrel Hill and East Liberty routes. We have been asked by them when will they be favored likewise.

Our present plans contemplate the purchase of ten more coaches, making a total of sixteen. Two of the new ones would be added to the Point Breeze route to permit 100 per cent operation of such coaches on a 7½-minute headway instead of the present ten-minute off-peak headway. The remaining eight will be put on Squirrel Hill in preference to East Liberty, because of the more industrial character of East Liberty riding, but eventually this type of coach will be our standard except for the possible use of the larger buses during peaks.

Create the Demand for Modern Street Cars*

BY M. B. LAMBERT

Transportation Sales Manager Westinghouse Electric & Manufacturing Company

THE American electric railway industry has a more intimate responsibility to the public than any other industry. The nature of its service brings it into more intimate contact with a larger part of the public than do the steam railroads or any other public utility. Hence the electric railway executive has a far greater responsibility to his community than any other citizen in that community. The industrial and social progress of every community depends to some degree upon the vision and enterprise of its electric railway executive. The character of the support and co-operation that he enjoys from the public he serves also depends very largely upon the spirit and enterprise that he imparts to his entire organization and the character of service rendered to the public.

The exhibition of modern street cars

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*Address presented before Central Electric Railway Association, Toledo, Ohio, Feb. 3, 1927.

and other developments in the art of transportation at our annual conventions brings before every electric railway executive once each year all of the advances the manufacturers and operating engineers have evolved for the betterment of community transportation. Every electric railway company that has developed improvements in car design owes it to itself and the industry as a whole to exhibit these at the annual convention. It is largely through such co-operation and exchange of ideas that the industry advances. The progressive executives must of necessity carry the burden of encouraging and exciting interest and enthusiasm in the others, because if they do not their own efforts and that of the industry, as a whole, are materially hampered.

THE CO-OPERATION OF THE MANUFACTURERS

The manufacturers serving the electric railway industry are enjoying a very extraordinary co-operative set-up, fostered by the American Electric Railway Association and the technical press. In spite of this there is a feeling in some quarters that the manufacturers are not doing all they might do to promote the welfare of the industry to the degree that it justifies.

What are the extraordinary things the association and the technical press are doing to encourage the manufacturer? The most outstanding are:

The American Electric Railway Association provides for membership of operating companies and manufacturer companies on an equal basis. Buyer and seller are brought together in a common co-operative plane.

The association has established the manufacturers' co-operative committee, the chairman of which reports at all its executive committee meetings and has the privilege of the floor at annual conventions to submit a complete report of progress.

The association president and the managing director have for several years past devoted considerable time and effort in calling together numerous manufacturing representatives, urging them toward greater co-operative effort in promoting the adoption of modern equipment by the industry; in fact, helping the manufacturers to increase their sales.

The association set up an engineering committee to study and promote modern standard city and interurban cars, and, with association funds, published in book form the report of this committee.

The ELECTRIC RAILWAY JOURNAL staff, co-operating with the association executives, have called conferences of manufacturers at recent conventions and displayed charts and data showing the opportunities for replacement of the old with the new, modern equipment. In addition they have had these studies printed in attractive pamphlet form and distributed throughout the country—*Electric Traction* and *Forbes* offer prizes annually for special operating accomplishments.

In general, the situation is unique in that the progressive electric railway executives and their national association executives for the past several years have been the "loud speakers" in urging the adoption of modern cars and equipment in a much more pronounced way than the manufacturers themselves have been. This year the association has broadened the scope of the manufacturers' co-operative committee, perhaps with the idea that this may arouse greater interest among all manufacturers to assume to a greater degree their own part in adequately promoting the development and sale of cars that will attract greater riding and reduce operating costs.

FACING A NEW SITUATION

The electric railway industry is no longer a monopoly in the sense that it is without competition. The private automobile is a formidable competitor, and in another sense the auto bus is a competitor to many electric railway manufacturers, while it at the same time opens up new markets to the larger electric railway manufacturers. Every electric railway manufacturer could consistently take his hat off in deference to the commercial progressiveness of the automotive manufacturing group. They have displayed in good measure the enthusiasm, courage and salesmanship that a youthful industry in this era may consistently possess. The electric railway manufacturers may with profit imbibe much of this enthusiasm and courage. As Admiral Schley said, "there is glory enough for all." The auto bus is here to stay, and so is the electric railway. Each has a service to perform distinctly its own, and the demand for transportation service in our progressive American communities is going to command right along the best engineering and sales talent that both forms of transport have to offer.

The chairman of the manufacturers' co-operative committee of the American Electric Railway Association has laid down a program for this year's activity, in addition to its publicity functions. The plan is to drive home in the minds of every manufacturer that it is to his interest to excite interest in and promote the sale of modern cars. The demand for all devices and appliances sold to the electric railway industry is increased with the adoption of modern cars. Every salesman serving the electric railway should keep that fact constantly before him. The more new cars that are sold and the better the service that is offered the public the greater will be the demand for both new cars and new buses. Let the slogan among the manufacturers in selling transportation be: "One for all and all for one." Sell modern street cars.

Kentucky Association of Public Utilities Meets February 18-19

"CITY and Interurban Transportation" will be discussed by W. H. Sawyer, guest of honor at the tenth annual meeting of the Kentucky Association of Public Utilities, held at the Brown Hotel, Louisville, Ky., on Feb. 18 and 19. Other subjects of interest on the program are: "Twenty Years of Utility Growth in Kentucky," by Harry Reid, president National Electric Power Company, New York City; "Humanitarian Aspects of Safety," by Neil W. Funk, director of safety, Louisville Railway, Louisville, Ky., and "The Man May Pay, but Remember, It's the Woman Who Buys," by Helen E. Steiner, divisional chairman women's committee East Central Division, National Electric Light Association, Cleveland, Ohio.

Increasing Speed and Comfort by Modernization of Equipment*

BY E. A. PALMER
Westinghouse Electric & Manufacturing Company

OPERATING organizations of our electric street railway companies and equipment manufacturing organizations are devoting particular attention to those items which contribute to fast, comfortable service and thereby attract more patronage to the electric railway business.

High schedule speeds on city surface lines are a function of the rate of acceleration, free running speed and rate of braking of the rolling equipment. Quadruple equipments of high-speed motors for double-truck cars during the past four or five years have comprised about 80 per cent of the installations, being preferred to double motor equipments because of the more rapid acceleration possible. Theoretically the energy consumption is lower for two motors than for four, because larger, more efficient units are involved and the weight efficiency is higher. Maintenance of the motors should be less because only half the number are involved and a part of the maintenance expense is nearly independent of the size of the motor. However, the majority of experienced operators feel that these theoretical advantages of the two-motor equipment are overcome by the waste of energy and excess stresses caused by wheel slippage and by the superior acceleration of the four-motor car.

The low floor car has been adopted by the industry almost universally. Since the innovation of this idea in 1912 a complete line of motors up to 60 hp. has been developed for use on wheels up to 28 in. diameter. During the last three years 85 per cent of all cars for which the Westinghouse company furnished the electrical equipment had wheels of this size or smaller.

One-man operation of street cars is now an established practice. The use of one-man cars has extended steadily during the last ten years. Frequently two-man cars can be so arranged that they may be operated by one man if the occasion arises. Whether cars should be single or double end depends on whether wyes and loops are available for turning. Approximately 80 per cent of all equipment furnished over a number of years has been double end.

Considerable study is being given at the present time in some large cities to multiple-unit two-car train operation.

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*Abstract of a paper presented at a meeting of the Electric Railway Association of Equipment Men, Southern Properties, held at Memphis, Tenn., Jan. 26-28.

The permanently coupled articulated train has been very successful on some properties.

New cars must be adequately ventilated during the winter season. The majority of the men in the industry are quite satisfied with the arch roof and ventilation construction at present standard with all car builders. A heating system that will maintain a comfortable temperature is necessary. Electric heat seems to be specified on most new city cars where the winters are moderate.

A good proportion of cross seats properly spaced insures comfort. Practically all the plans of new cars specify all the cross seats possible. Safety devices interlocking the controller, line switch, doors and steps, and brakes are being used on practically all cars for one-man operation and most cars for two-man operation. Cars should be efficiently illuminated so that passengers may read without eyestrain even on rush-hour voltage. There is opportunity for the use of beautiful yet useful fixtures. The ceiling finish should reflect rather than absorb light.

New light-weight, one-man, two-man low-floor cars generally weigh less per seat than the cars replaced. The energy saving is generally in direct ratio to the reduction in weight. This is considerable where maximum demand energy contracts prevail.

Maintenance of equipment per car-mile should be less the first few years even though the new cars be kept in almost continuous service in the non-rush period of the day. The platform time savings will be very substantial if a change is made from two-man to one-man operation with the introduction of the new cars.

The Brooklyn City Railroad showed 28 per cent increase in traffic on one line with new cars and Thomas Fitzgerald, vice-president Pittsburgh Railways, advises that during recent years every time new cars replace old cars on a line the receipts increase substantially.

Without cheap and reliable electric railway transportation it would be impossible for the large business organizations in the congested sections of our cities to exist. Let us therefore all boost for the modernization of our rolling equipment.

Birney Club Discusses de Luxe Cars

LIVELY discussion of car modernization and the present-day tendency toward the inclusion of more luxurious seats and accommodations for the comfort of passengers took place at the regular monthly meeting of the Birney Club of St. Louis held on Feb. 7 at the Missouri Athletic Club. There was general agreement of the need and importance of modernizing car equipment to meet the level of present-day transportation demand. Differences of opinion were expressed as to just what steps in car design and construction are needed to fulfill this demand and to increase the popularity of street car riding.

L. F. Stoll, assistant vice-president McGraw-Hill Publishing Company, Inc., and Charles Gordon, editor ELECTRIC RAILWAY JOURNAL, were called on for short talks by President Richards. Mr. Stoll discussed the significance of the fundamental changes taking place in the transportation industry and indicated that these changes are perhaps taking place faster than the industry itself realizes. Mr. Gordon spoke on the electric railway equipment situation and pointed out that the present widespread tendency to repaint and rebuild existing equipment is an index of the general interest being taken in car improvement. He held that this activity offers the equipment manufacturers an opportunity so to improve the performance and the ride merchandising appeal of their product as to demonstrate conclusively the desirability of replacing old equipment with new cars instead of rebuilding.

Bus Drives Compared

RELATIVE advantages of mechanical and electrical drive for buses were discussed at considerable length at the February meeting of the New England Street Railway Club held at the Copley Plaza Hotel, Boston, Feb. 3. This topic aroused much interest on the part of the members and evoked many questions. Charles Froesch, engineer Mack Trucks, Inc., reviewed the technical features embodied in the gas-electric drive and showed by means of lantern slides the latest practice in adapting this drive to the new buses now in process of development. R. E. Fielder, sales engineer Yellow Truck & Coach Manufacturing Company, spoke briefly from his experience, running back over a period of twenty years of bus operation, and said that the future is promising for electric control. He stressed, in particular, the economics of operation, based on experience with crowded thoroughfare operation of buses in places where electric drive has proved both economical and desirable. Where the traffic averages four passengers or more per bus-mile, he said that electric control has an undoubted advantage. On the other hand, both speakers were of the opinion that on long suburban runs, where few speed changes are necessary, mechanical drive is superior in certain respects.

J. C. Thirlwall, engineer General Electric Company, added to the opinions of the previous speakers by citing the experience of the Philadelphia Rapid Transit Company. Greater ease in riding, less annoyance from speed changes, more comfort in every respect are features of electric drive that attract passengers. The speaker concluded that large operating companies are inclined to turn toward electric drive almost without exception. The Boston & Maine and the New England Transportation Company were cited as local companies favoring this method of drive.

In the discussion that followed the remarks of the speakers it was brought out that the recent acceptance of $2,000,000 of equipment bonds issued for electric drive buses to be purchased on a ten-year life period is perhaps the most marked acknowledgment of the dependability and practicability of the electric drive.

Speaking at the close of the dinner, Ralph S. Bauer, Mayor of Lynn, Mass., advocated closer co-operation and stronger partnership on the part of public service companies in the solution of many problems confronting municipalities today.

New York Railroad Club February Meeting

"TRAINING Understudies for Official Positions in Railroad Service," will be the subject of discussion at the meeting of the Railroad Club on Feb. 18, to be held at the Engineering Societies Building, at 8 p.m. Prof. William J. Cunningham, who is the James J. Hill professor of transportation at Harvard University Graduate School of Business Administration, will be the principal speaker. He advocates the creation of a corps of cadets, graduates of universities and technical schools, and those without college training who have shown exceptional promise in their work. Men who graduate from the course with high standing, according to Professor Cunningham, should form the group from which one-half or more of the minor officials for the various departments should be selected.

American Association News

American Executive Committee

STANDING and special committee reports occupied the attention of the executive committee of the American Electric Railway Association at a regular meeting held in Toledo, Ohio, on Feb. 4, 1927. Members in attendance were President W. H. Sawyer, Managing Director Lucius S. Storrs, Executive Secretary J. W. Welsh, R. P. Stevens, J. H. Hanna, F. R. Coates, L. E. Lippitt, C. B. Proctor, Daniel Durie, J. V. Sullivan, E. P. Waller, B. A. Hegeman, Jr., G. A. Richardson, S. J. Cotsworth, C. R. Ellicott, H. L. Brown, E. B. Meissner, C. L. Henry and K. A. Simmon representing M. B. Lambert. Representatives of state and sectional associations present by invitation included E. T. Chapman, president of the Connecticut Company section; G. K. Jeffries, president of the Central Electric Railway Association; C. R. Phenicie, for the Wisconsin Utilities Association; A. E. Reynolds, president Midwest Electric Railway Association; C. F. Handshy, president Illinois Electric Railway Association; J. J. Coleman, for the Pennsylvania Street Railway Association; W. V. Griffin, president Chicago Rapid Transit Company section.

In addition to routine business, Thomas Fitzgerald, chairman of the committee on the Anthony N. Brady award, outlined the conditions which have been fixed this year for judging accomplishment in the interest of safety. It was recommended that a gold medal be given to that property which had made the most outstanding accomplishment in the class operating 5,000,000 or more vehicle-miles per year. A silver medal will be given to the winning company operating between 1,000,000 and 5,000,000 vehicle-miles, and a bronze medal to the property having made the greatest contribution to safety in the class operating less than 1,000,000 miles per year. In the classification of properties for the award bus mileage is to be included with car mileage.

F. R. Coates, reporting for the committee on co-operation with state and sectional associations, recommended that the presidents of all sectional and state railway associations be made members of the American Association Executive Committee, without voting power. In the case of a combined utility association, this privilege would be extended to the chairman of the railway division or to the railway member designated by the sectional association. There was some discussion regarding the matter of membership in the American Association on the part of such sectional associations, and an alternative suggestion made that the presidents of these associations be invited to attend executive committee meetings. The matter was referred to the committee on revision of constitution and by-laws for further consideration.

H. L. Brown, chairman of the subjects and meetings committee, reported the result of a preliminary survey of the industry for opinion regarding the most valuable form of meeting and the character of subjects considered of most interest for an annual convention. Replies received indicate a preponderance of opinion in favor of comparatively short sessions with a few prominent speakers supplemented by group conferences on current operating subjects.

A preliminary report of the committee on revision of the constitution and by-laws was read by Charles Gordon, representing James H. McGraw, chairman of the sub-committee on association dues.

Since the action of this committee is contingent on the work of the policy, finance and other committees the report was principally in the nature of reporting progress and of informing the executive committee regarding the work which had been undertaken. A schedule of proposed dues was submitted for the purpose of establishing the basis on which the association's expense would be divided between companies of various sizes and classifications, the final schedule to be determined after various studies of association activity are completed.

Resolutions regarding the holding of demonstrations outside of regular exhibits, the setting aside of a day for inspection of exhibits and inspection of manufacturing plants during the annual convention, were passed. These were similar to resolutions on these matters adopted in previous years.

REPORT OF POLICY COMMITTEE

The report of the policy committee, read by Chairman R. P. Stevens, was as follows:

"Questions which have been referred to this committee for study and recommendation as to policy include the association's publishing plan, its statistical service and its Washington office.

"A recommendation was made by the publications committee that rates for advertising in *Aera* be increased. In bringing this specific question before the policy committee the president asked that a review be made of all phases of the association publishing plan with particular reference to possible co-ordination of this effort with the similar work of the business publications serving the industry.

"There was no thought that *Aera* should be done away with but that this committee should consider whether some change in its general character might better serve the interests of the association, avoid duplication and effect economy. There was also no thought that this review should in any way reflect unfavorably on the work of those who have been responsible for producing the magazine *Aera*. They have done a commendable job of carrying out the present publishing policy. The question is whether this policy should now be somewhat revised.

"After some investigation by the finance committee, the policy committee was asked to consider whether the services of the bureau of information and service might to advantage be expanded, or whether these might be somewhat curtailed in the interest of economy without serious detriment; also, whether co-ordination between the association's statistical work and that of the business press might be effected with economy and with strengthening of the facilities for securing and presenting these data. Again, this committee understands that there is no idea of doing away with the association's statistical service. The question did not arise through suggestion of dissatisfaction with the work of those in the headquarters staff assigned to this task, but only because the president has felt it wise that from time to time we should have a review of all major phases of the association work. It is only in this light that this committee understands its study is to be made.

"The finance committee has also questioned the necessity of the association continuing to retain an exclusive Washington office, as has been desirable heretofore. It was started as a war-time necessity. The policy committee was directed to give consideration to all phases of this question.

"On none of these three matters has this committee carried its study far enough to be able to make any recommendation at this time. It is desired only to report progress."

The report was signed by G. A. Richardson, C. R. Ellicott, H. L. Brown, J. P. Barnes and R. P. Stevens, chairman.

Presidents of the affiliated associations reported on the progress of their work, and visiting presidents of sectional associations expressed their desire to co-operate with the American Association.

The next meeting of the executive committee was fixed for Friday, April 1, at association headquarters in New York.

Co-operation with State and Sectional Associations

PLANS for getting better accord between the various associations occupied the members of the committee of the A.E.R.A. on co-operation with state and sectional associations held at Toledo, Ohio, on Feb. 4. Members present were F. R. Coates, chairman; R. F. Carbutt representing T. R. Langan, A. E. Reynolds, W. A. Alexander, W. V. Griffin, E. T. Chapman, C. R. Phenicie representing J. P. Pulliam, R. McGregor, C. F. Handshy, J. J. Coleman, W. W. Holden, W. R. Robertson and Charles Gordon.

Mr. Coates called on representatives of the various associations, who spoke regarding the development of some means of keeping each local association as well as the national association informed of what the others are doing.

New Association Members

FOUR operating electric railways, two manufacturers and ten individuals were elected to membership in the American Electric Railway Association at the executive committee meeting held at Toledo on Feb. 4. Following is a list of companies elected:

Alton Railway, Alton, Ill.

Illinois Power & Light Corporation, Chicago, Ill.

Jamestown Street Railway, Jamestown, N. Y.

Youngstown Municipal Railway, Youngstown, Ohio.

H. K. Ferguson Company, Cleveland.

J. D. Wallace & Company, Chicago, Ill.

Getting On with the Public

UNDER the general subject of "The Transportation Man and His Job" a meeting of the Metropolitan Section of the American Electric Railway Association, held on Feb. 4 at the Engineering Societies Building, New York City, resolved itself into a discussion of how to get on with the public. G. T. Geer, secretary Third Avenue Railway, emphasized the importance of courtesy and co-operation. He said that these come naturally to some men, but not to others. The latter, however, can at least adopt the outward form and in due time this will beget the proper spirit, he said.

Isabell Davie, secretary women's committee, Public Relations Section, National Electric Light Association, spoke about "The Woman in the Utility Field." She told how women can make themselves useful, particularly in the electric light industry.

"What the Public Thinks of the Transportation Man" was the subject of a talk by Major J. S. S. Richardson, director Public Service Information Committee of Pennsylvania. He pointed out that it does not always matter whether or not a thing is true; if the public believes it, it might as well be true so far as public relations are concerned.

The meeting was conducted under the sponsorship of a committee consisting of H. F. Merker, Brooklyn City Railroad; W. S. Keller, Third Avenue Railway; K. S. Lewis, Interborough Rapid Transit Company, and H. R. Sisson, Sisson Supply Company.

The News of the Industry

Eight Cents in St. Louis—Fares Fight Likely

Acting under a temporary restraining order issued by United States District Judge Reeves at Kansas City, Mo., forbidding the Missouri Public Service Commission or any state officer from interfering, the United Railways St. Louis, Mo., on Feb. 7 put into effect a new schedule of fares. Under the new rates adults must pay 8 cents for a single cash fare but may buy two tokens for 15 cents. The railway is giving each patron a receipt for 1 cent for each cash fare or every two tokens purchased. These receipts will be redeemed if the increase is held later to have been unjustified. Children's fare remains at 3 cents. The order issued by Judge Reeves is returnable within ten days. At that time it is probable arguments on the merits of the company's demand for the higher fare will be heard by two federal district judges and one circuit judge. Provision for this is made in the order of Judge Reeves, and this board would decide whether the higher fares should be made permanent.

In its appeal to the federal court the United Railways claimed that the valuation of its properties is $75,000,000 instead of approximately $58,000,000, allowing for additions made since 1919. In 1923 the Public Service Commission fixed the valuation of the property at $52,000,000 as of 1919. The company says that the 8-cent cash fare for adults with two tokens for 15 cents will yield it only 5.8 per cent upon the valuation of $75,000,000.

The action of the railway in applying to the federal courts for relief has been anticipated for some time. The action by the commission that forced Receiver Wells to go into the federal courts came on Feb. 4 when the commission suspended until June 7 the new schedule of fares the company had filed with the commission to take effect on Feb. 7. That forced a continuation of the 7-cent fare, under which it was claimed the railway was losing $160,000 a month.

Prior to taking its case to the federal courts the company exhausted other methods of obtaining aid from the state commission. On June 3 last, Receiver Wells, with the permission of the United States District Court in St. Louis, applied for an increase in fares, but did not state the exact amount desired. Upon the request of the city the state commission then ordered an audit of the company's books to determine whether an increase was needed. The commission then delayed until September before attempting to start the audit. In October Receiver Wells again requested the commission to grant a temporary increased fare pending the final audit. Hearings were held and again the commission took the matter under advisement. On Jan. 7 the receiver made the final move possible under the state laws, the filing of a new schedule of fares to take effect on Feb. 7 unless suspended by the state commission. The commission then suspended the new rates, contending that the company having first followed the method of applying for an increase should have awaited a decision on that application. The commission admits that its audit of the earnings of the railway will not be completed before March 1.

Ten Cents Cash in Syracuse

Review of Facts Which Led Commission to Advance Fares in Salt City—Company Earning Less than 4 Per Cent—New Rate Not Likely to Return 8 Per Cent

THE Public Service Commission on Feb. 4 authorized the New York State Railways, effective on Feb. 10, to establish new fare rates on its Syracuse Lines, ten tickets for 75 cents; single cash fare, 10 cents, the new rates to continue in effect until the commission shall otherwise order. The present cash fare is 7 cents.

While no valuation was fixed by the commission the rates were determined upon a tentative rate base of $9,426,739 as of Sept. 30, 1925. Based upon revenue passengers carried for the year ended Sept. 30, 1925, and under the new fare rates authorized, estimating a 2 per cent decrease in travel, 70 per cent of riders using tickets and 30 per cent paying cash fares, the increased revenue, based on the tentative valuation of $9,426,739, will give an estimated return of 7.58 per cent upon such value of the property used in giving service on the Syracuse Lines.

The tentative rate base established was based on a valuation by the commission in its decision on April 19, 1921, of $8,554,240 plus additions to property since that date and allowances for materials and supplies and working capital.

The order was based upon a memorandum by Chairman Prendergast, who said:

> Even on such a tentative rate base, the rate of return enjoyed by the Syracuse Lines of the petitioner during the year ended Sept. 30, 1925, was less than 4 per cent. Further, that the increased rates prayed for will likely provide a rate of return of considerably less than 8 per cent.
>
> Petitioner has failed for many years to pay dividends and has certainly exhausted every reasonable expedient in endeavoring to effect economies so as to continue operations at the rates fixed by this commission in 1921. The financial results have been at least as disappointing as those set forth in a table covering 1925 revenues and expenses.
>
> Therefore, upon this record and without a formal fixation of valuation, it is determined that the rates prayed for by petitioner will in no event be unreasonable and they should be permitted to file, to be effective as of Feb. 10, 1927, and continue thereafter until the commission shall otherwise order or direct.

Evidence showed that the actual passenger revenue for the year ended Sept. 30, 1925, was $2,254,085 and the estimated increased revenue, due to the increased fare rates, will be $346,023. This estimate took into consideration a 2 per cent decrease in the number of car riders due to increased fare.

Five valuation estimates were submitted on the hearing, as follows:

> Commission's valuation, estimated present-day costs, less observed depreciation and not including organization expense and working capital, $8,485,168.
>
> New York State Railways, estimated reproduction cost, new, no depreciation, $15,658,081, and valuation used by Public Service Commission as of Dec. 31, 1921, with net additions to Oct. 1, 1925, $9,601,534.
>
> City of Syracuse, estimated original cost, less accrued depreciation, $5,105,316, and as reported to State Tax Commission, reproduction cost, new, $9,395,447, and present value, $6,337,895.

Chairman Prendergast, in discussing the valuation figures presented, said:

> Here, as is usual in rate proceedings, there was considerable dispute and variance of opinion as to the value of the petitioner's property, the existing depreciation and the rate of return to which the petitioner may be legally entitled. In view, however, of the conclusions reached in this memorandum, it will be unnecessary, as hereinafter shown, to enter into an extended discussion of any of these questions except that of valuation.
>
> Petitioner presented a reproduction cost new, valuation of its property as of Sept. 30, 1925, and also another valuation arrived at by taking the amount determined by the commission in the last rate case and bringing it down to date by including additions to property since Dec. 31, 1921.
>
> The city of Syracuse offered exhibits showing values based on estimated cost, less depreciation, and also on reports made by petitioner to the New York State Tax Commission for 1925, to which certain amendatory and adjusting figures were applied.
>
> In addition, engineers of the commission prepared and submitted a statement of values based on present-day costs less depreciation.
>
> The city's cost less depreciation figures have certain inherent disabilities, which in our opinion, render them useless as an aid in the fixation of values. Their apparent source was Exhibit "E" in Case No. 7938, April 19, 1921. Referring to the opinion of Commissioner Kellogg in that proceeding, it appears that Exhibit "E" was in part at least based on reports made to state officials by some of the predecessor companies prior to the establishment of the Public Service Commission.
>
> We have already referred to the complex and involved corporate consolidations culminating in the establishment of petitioner. The network of relationship, together with the methods of bookkeeping pursued, and the absence of many basic records, all tend to render it well-nigh impossible to find the original costs of much of the property acquired in the earlier days of street railway operation in Syracuse. In Case No. 7938 Commissioner Kellogg found:
>
> "That it is not possible . . . to make an accurate statement of the actual original costs of all the property" and

> "For these reasons, the estimate of the city of the actual cost to the company cannot be taken . . . because there are no complete data from which such cost can be entirely computed."
>
> The precise situation still exists as to original cost estimates. Prior to Dec. 31, 1908, there were no regulations governing the keeping of uniform accounts by electric railways and neither books nor records can now be found (nor could they be found at the time of the investigation in Case No. 7938) to show complete cost figures of the properties of the Syracuse & East Side Railway, which succeeded to the property and rights of the Syracuse, Eastwood Heights & Dewitt Railroad and in Exhibit "E" $53,000 was set forth as being its original cost. But the company had 7½ miles of track, eleven cars and a power house. Obviously its value was and is much more than the amount stated. Further, certain amounts, concededly upon the company's books and aggregating nearly $1,000,000, had to be omitted because there was no means by which they could be checked. The data with respect to other constituent electric railways was also shown to be based on incomplete records and statements of account.
>
> In such a situation and upon such a record, it is apparent that these estimates of original cost cannot be safely made the basis of any finding of value.
>
> Neither can city exhibit valuation—$9,395,447 or the $6,337,895—be used. It is based in part upon reports made to the State Tax Commission as of Dec. 31, 1925, with amendments and changes. Different bases of valuation for tax purposes and rate-making purposes have been uniformly recognized.

Reproduction cost, new, figures submitted by the New York State Railways as of Sept. 30, 1925, were prepared by Henry G. Throop, an appraisal engineer. He based his inventory and appraisal upon one made by McClellan & Campion and used in a former proceeding. Values were attempted to be brought down to date by the application of Oct. 1, 1925, prices and also by the use of index number percentages. After adjustments of account for retirements and additions, a total of $15,658.081 was reached. The commission said further:

> The valuation made and submitted by engineers of the commission was based on estimated present-day costs, less observed depreciation. The figure stated, $8,485,168, contained no allowance for organization, for cash working capital or for going value. If allowances be included for these items, such valuation would be upward of $9.425,000.
>
> There was also received in evidence the rate base fixed in the opinion of the commission of Sept. 21, 1922, $9,038,050. If to such base be added net additions to fixed capital, Jan. 1, 1922, to Sept. 30, 1925, of $540,565, as shown by the company's exhibit, or of $406,724 in the commission's exhibit, the rate base of Sept. 30, 1925, would be either $9,578,615 or $9,444.774.
>
> These valuations, with the exception of the commission's $8,485.168 and the company's $9.601,534, and the one referred to above, $9,578,615 or $9,444,774, are unsatisfactory and certain *indicia* of disability, which render them impossible and improper of use.
>
> In any view of the matter, if a valuation were required to be found in this proceeding, it would necessarily be in excess of $9,425,000.

Relative to the question of jurisdiction of the commission to fix fares, Chairman Prendergast says:

> The city of Syracuse argues that the commission is without authority to increase fares because of limitations affecting fares contained in franchises granted to the petitioner and its predecessors. This question was passed upon in the opinion of Commissioner Van Voorhis on Sept. 21, 1922, wherein it was stated, referring to opinion of the Public Service Commission, 2nd District, April 19, 1921:
>
> "There were no franchises granted between Jan. 1, 1875, and July 1, 1907, which limited the jurisdiction of the former Public Service Commission, Second District. (Matter of the United Traction Company vs. P. S. C. et al. App. Div. 3rd Dept., January term, 1927; and People ex rel. Garrison vs. Nixon, 229 N. Y. 575, as well as matter of Evans vs. P. S. C. 214, App. Div. 122, seem authoritative, and it must be held that the commission has jurisdiction over the rates of fare in this proceeding)."

The fare was 5 cents prior to Nov. 26, 1918. It was then increased by the Public Service Commission, Second District, to 6 cents and in 1921 the Public Service Commission, Second District, authorized an 8-cent fare, four tickets for 29 cents, and a children's fare of 4 cents.

The city on Dec. 15, 1921, asked a reduction and on Oct. 1, 1922, the Public Service Commission directed a 7-cent fare.

Chairman Prendergast reviews the history of the New York State Railways, stating that that part of the system known as the Syracuse Lines involves a track mileage of about 98, of which about 74 miles is in paved streets. In 1912 the New York State Railways purchased the Syracuse Rapid Transit Railway. The latter leased and owned the East Side Traction Company and had succeeded under mortgage foreclosure to the properties and franchises of the Syracuse Street Railway and the Syracuse Consolidated Street Railway. The East Side Traction Company was the successor of the Syracuse & East Side Railway, which in turn had succeeded the Syracuse & Eastwood Heights & Dewitt Railroad. The Syracuse Street Railway was the successor of the Peoples Railroad, which had acquired all the assets of the Central City Railroad and the Syracuse & Onondaga Railway. The Syracuse Consolidated Street Railway was formed by the merger of nine street surface railroads operating horse car systems at the time of acquisition. The memorandum of the commission says that this series of mergers, consolidations and purchases becomes more than historically important because of the effect upon the original cost estimates of the petitioner's properties.

Final Arguments on "L" Lease

The Public Service Commission of Pennsylvania on Feb. 7 took under final consideration the application of the Philadelphia Rapid Transit Company and the city of Philadelphia for approval of the 30-year Frankford elevated and Bustleton surface line lease. While the city and the company made almost identical requests for approval of the lease, opponents contended the lease would work a hardship upon the city, the taxpayers and the car riders.

City Solicitor Gaffney said the lease as it is drawn is only an amendment of one approved in 1922 by the commission. Instead of the graduated plan of paying an annual percentage up to 5 until 1957, the company under the new lease will pay the fixed charges, including sinking fund, interest and state tax and an amount equal to that contemplated by the 1922 lease.

C. Oscar Beasley, appearing for the United Business Men's Association, said the car rider and taxpayer would pay for the "L" and continue to pay. Harold Evans, representing J. Henry Scattergood, a former Public Service Commissioner, who has always been an enemy to the lease, also argued against the "L" lease approval.

Decries City Attitude in Buffalo

A growing understanding among thinking people of the basic facts of the transportation situation in Buffalo, N. Y., was recently urged by Elliott C. McDougal, chairman of the Marine Trust Company, in an address decrying the attitude of the city toward the International Railway and the downtown station plan of the New York Central. It was his belief that the best results were obtainable only by co-operation and by bargains mutually beneficial. On this point he says:

> Every business man knows this by experience. He cannot quarrel with his customers; both buyer and seller must be pleased. Should the present battle continue, the city as a corporation would lose because its share of the company's receipts cannot increase those receipts increase. The company would lose even after curtailing its service to the utmost possible limit. The car riders would lose because of the curtailed service on the old lines and because of the stoppage of the opening of new lines. With present conditions all three lose; with co-operation and fair dealing all three would win.

With reference particularly to the transportation problem in the city, he said that the city was in need of good electric railway and bus service and that it was better to be served by a company financially strong than one financially weak. Continuing, he said:

> We appear to be doing everything that we can to weaken the present company and to compel it to spend, in defending itself against unwise legislation, money that would much better be spent on track, pavements and service.

Another Subway Plan Suggested for Providence

Expenditure of the sum of $17,000,000 would furnish Providence, R. I., with a system of equipped subways which would eliminate all surface cars from the business section of Providence and provide a safer, speedier and more comfortable means of travel at an increase of 1 cent in the present fare rates. This was the opinion expressed by William M. Lewis, assistant engineer in the Boston Transit Department, at a meeting of the Providence Engineering Society recently.

Mr. Lewis was associated with the building of the Tremont Street subway at Boston in 1894. He is the second speaker to discuss traffic problems of Providence at the Engineering Society during the last two months, the previous authority being Robert H. Whitten, city planning consultant. Mr. Lewis stated, however, that his subway proposition was not suggested to displace the Whitten plan, but was to be used in conjunction with it.

The plan as outlined by Mr. Lewis would provide for two subways, each running through Exchange Place, where a transfer station would be built. They would be laid with double tracks, would accommodate all traffic brought into the down-town district by electric cars, with two exceptions. In commenting on the change that would be wrought in traffic conditions by the removal of surface cars in the business section of Providence, Mr. Lewis held up Exchange Place as an example. By nature, he said, Exchange Place was a beautiful square, but now it was little more than a railroad yard most of the time.

Paving Relief Measure Introduced in New Jersey

In a modified form there has been introduced in the Legislature of New Jersey by Senator Abell of Morris County the bill to relieve the electric railways of the obligation to pave between tracks. Last year's bill failed to pass over Governor Moore's veto. It provided that the company be relieved of the entire cost of this paving. Senator Abell has explained his bill as follows:

> The purpose of this bill is not to relieve railways of all paving obligations but rather to readjust those obligations so as to bring them into harmony with modern economic conditions and make them uniform throughout the state. Under this bill such companies at their own expense will have to restore all pavements they may disturb in connection with trackwork and in addition will be obligated to repair at their own expense damage heretofore or hereafter done to streets.

Chicago Street Traffic Article Reprinted

SEVERAL requests have been received for additional copies of the article entitled "Street Traffic Analyzed in Chicago," appearing in the ELECTRIC RAILWAY JOURNAL for Jan. 8, 1926. The JOURNAL has therefore had a limited number of reprints made and these are available in lots of 50 or more at 10 cents a copy.

Fort Wayne Company at Home to Public

Proud of the completion of its construction program for the year, the Indiana Service Corporation, Fort Wayne, Ind., decided recently that it would be a good plan to exhibit the whole plant to the public. This it did on Nov. 21 between the hours of 2 and 5 p.m. The response on the part of the public was most gratifying. To the end that the tour might be conducted to its own best advantage and the best advantage of the public, the company had about fifteen platform men in uniform act as directors of traffic or guides. In addition other men were in attendance from different departments to answer questions and to direct the public once they were inside the building. As an extra precaution the company strung ropes around certain places, notably in the power houses and to some extent around the car pits in the shop, so as to minimize the element of danger that adheres in all such plants.

In anticipation of the event, the company advertised its invitation to the public to inspect the property, in the newspapers and with car cards. It is, of course, the regular practice of the company to display car cards in all its city cars to advertise its own business and to call attention to civic events of importance. These cards are changed weekly. One of them, in which the text and the illustration have been placed side by side merely for convenience of reproduction, is shown in the accompanying illustration. In addition to this, the company issued a pamphlet to every one who visited the plant. This was a 24-page publication, 5 x 8 in., on tinted paper describing the activities of the company. In addition to this each visitor to the plant was presented with a small souvenir in the form of a holder in which to carry the weekly pass.

As to the work which was done during the year, the company moved into its new shops, which have been described previously in the ELECTRIC RAILWAY JOURNAL, and did a very large amount of remodeling of small buildings to take care of bus repairs. Added to all this the company built a cyclone fence around the whole Spy Run yard and improved the appearance of the surroundings by sodding the grounds close to the buildings and otherwise improving the landscape. In addition a building was put up for storage in connection with the power house. This is called the pipe storage building.

OPEN HOUSE
AT OUR
Spy Run Plant
SUNDAY
NOVEMBER 21
2 to 5 p. m.
EVERYBODY WELCOME

Car Card Used by the Indiana Service Corporation to Invite the Public to Visit Its Plant

Reorganization of New York Commissions Unlikely

Governor Smith of New York has practically abandoned his plan for reorganization of the Public Service Commission and the Transit Commission. When he was asked if he intended to appoint a successor to Commissioner Van Voorhees, whose term is about to expire, the Governor said he expected to do so.

The Governor's proposal to the legislative reorganization commission was in effect to separate the transit commission of New York and the up-state commission, which were consolidated by the reorganization laws, and not appoint a successor to Mr. Van Voorhees, so that there would be three members on each commission.

Wheeling Weekly Passes Made More Popular

As of Jan. 10 the Wheeling Traction Company, Wheeling, W. Va., made an immediate and large increase in sales of its weekly passes through certain consolidations and reductions. From a total of nineteen varieties, eighteen of which were in use since May 3, 1926, there are now eleven, although only three were eliminated.

In the new line-up, the $1 Wheeling and $1.25 Greater Wheeling passes have been merged into a single $1 Greater Wheeling pass. The $1 Brookside and $1.25 Martin's Ferry passes were merged into a $1 pass. The $1.50 McMechen and $1.75 Ohio passes were merged to a $1.50 pass called McBell, as it includes both McMechen and Bellaire. The $3 Moundsville and $3 Ohio Terminals passes were merged into a $3 pass. The $2 Linwood pass was cut to $1.75. The $2.50 Wellsburg, $2 Briliant and $1 Mingo passes were eliminated.

The McBell and Moundsville-Ohio Terminals consolidations greatly stimulate riding between the West Virginia and Ohio portions of the property, while the new Greater Wheeling pass makes one pass good for Wheeling and its immediate suburbs.

Attack on Indiana Commission

A new attack on the Indiana Public Service Commission is probable in the state House of Representatives. Two representatives have prepared a measure identical to the Cann Senate bill to abolish the commission and restore utility regulation to the agencies that existed before the law was enacted.

In all, five bills dealing with the commission are pending in the Indiana Senate. Their provisions range from complete abolition of the body to removal of municipally owned utilities from commission control.

Rules Off Obtrusive Fenders in St. Louis

Projecting fenders of the cars of the United Railways, St. Louis, Mo., must be discarded within 60 days, the Missouri Public Service Commission ruled on Feb. 1. The ruling follows a complaint filed by the St. Louis Safety Council that the projecting fender is a menace. Company officials also favored the substitution of safety devices of the type now in use in many other cities, but a city ordinance requires the use of the overhanging type of fender and a ruling from the state commission for their removal was necessary. Evidence showed that this type of fender had been abandoned in many other cities.

Fare Increase Sought in Utah

The Bamberger Electric Railroad has applied to the Utah Public Utilities Commission for a 10 per cent increase in rates of its first class one-way and round-trip fares between Ogden and Salt Lake City and intermediate points. The application declares that the one-way fare now charged between the points named is based on a charge of approximately 2¾ cents per mile, with a minimum fare of 15 cents, and that the round-trip fares are based on a charge of 180 per cent of the one-way fare, with a minimum of 25 cents. It is pointed out that the Denver & Rio Grande Western Railroad first class one-way and round-trip fares between Salt Lake City and Ogden and intermediate points are based on a charge of approximately 3.6 cents per mile. For more than six years past the revenue from passenger travel on the Bamberger has shown a yearly decrease of $35,000, or a total of $214,039, and that in order to enable the petitioner to continue to give the public adequate and efficient service additional revenue must be obtained.

The application also states that in the event the request is granted for increased fares the road will resume operation of bus service between Salt Lake City and Ogden and intermediate points in co-ordination with the other service. It also states that, providing the increase is allowed, the fares will be applicable to bus lines also. Under the proposed increase, the first class one-way fares will be based on a charge of 3 cents per mile, with a minimum fare of 20 cents, and the first class round-trip fares will be based on a charge of 180 per cent of the proposed first class one-way fares, with a minimum fare of 30 cents.

Pittsburgh Railways Officials Entertain Former Employees

There gathered in Pittsburgh, Pa., on Feb. 2 a group of men, all former Pittsburgh Railways employees, who are eminently successful in electric railway affairs. These guests of the railway included J. H. Alexander, B. J. Yungbluth, G. C. Hecker and J. W. Welsh. The *Sun* thus summarized their careers:

> Mr. Alexander started work for the Pittsburgh Railways in 1910 at $85 a month. He was a colonel in the United States army for two years during the war and now is president of the Cleveland Railway.
>
> Mr. Yungbluth commenced his railway experience as a $15-a-month oil room employee of a Mexican railroad and shortly afterward came to the Pittsburgh Railways, where he remained ten years. Today he is president of the International Railway, Buffalo.
>
> Mr. Hecker worked nights for the Pittsburgh Railways in 1910 in the load dispatcher's office and attended classes at Carnegie Tech. From 1912 to 1917 he was chief electrician for the company at Pittsburgh, later becoming electrical engineer. Now he is special engineer for the American Electric Railway Association at New York.
>
> Mr. Welsh worked in 1906 as car tester at the Homewood carhouse. In 1918 he was electrical engineer and traffic manager for the Pittsburgh company. He came back today for a visit as executive secretary of the American Electric Railway Association at New York.

A. W. Robertson, president of the Pittsburgh Railways, entertained the group.

Reunion at Pittsburgh Brings Former Employees Together

Schenectady Railway Seeks Rehearing

The Schenectady Railway, Schenectady, N. Y., filed a petition on Feb. 1 with the Public Service Commission for a rehearing of the proceedings before the commission on the application of Bohl Brothers and John Coons for the transfer of certificate for the operation of a bus line between Schenectady and the hamlet of Guilderland. At the first hearing in this proceeding, the railway advised the commission it had no objection to the transfer. Subsequently Bohl Brothers operated the line as a through route from Schenectady to Albany, they already having acquired the right of D. C. Main to operate between Albany and Guilderland. To this method of operation, the Schenectady Railway objected.

The appeal for rehearing refers to the order of the commission denying a certificate to David W. Jeram and David W. Jeram, Jr., for operation of a through bus line between Albany and Schenectady on the ground that the Schenectady Railway and the New York Central Railroad were rendering adequate service.

Concern in San Francisco

A steadily growing deficit in the San Francisco Municipal Railway, San Francisco, Cal., due to falling receipts and increased expenses has greatly alarmed city officials, who recently voted the platform men a raise in pay. Practically all the officials are in favor of the men getting a $6 a day wage, but many of them are wondering where the money is coming from if the 5-cent fare is to be maintained and the tax rate not raised.

It has been estimated that receipts have fallen off approximately $100,000 and that operating expenses have been increased $182,000, due chiefly to increases in pay granted the men since last May.

According to the books of John Hannan, accountant for the Board of Public Works, the actual deficit of the operation of the lines from May 1 to Nov. 30 was $38,000. But added expenses went into effect the first of the year and now officials are unable to predict just what the deficit will be by June 30.

Many causes are cited for the falling off in revenue—automobile competition, the fact that some lines operate in undeveloped territory which has not been fully settled and from which no great increase in revenue can be expected, and several others.

A 40-cent raise in daily pay was granted the men last May, when city officials fixed $3,500,000 as about the amount of revenue that would be taken in by Dec. 1. The actual receipts, however, proved to be only $3,101,346. It is not believed that the December receipts were more than $300,000, which leaves a discrepancy of about $100,000.

Late in December a second raise of 20 cents a day was voted for platform men.

Accountant Hannan declares that either an increase in fares or a resort to the tax rate for funds is the only way out of the dilemma.

Edward Van Deleur, president of the carmen's union, said:

> If the supervisors will give the railway system credit for what it earns, I believe it will take care of most of the increases in pay.
>
> By this I mean the interest on the daily balances of Municipal Railway funds should be credited to the railway account. The money now goes into the general fund and is used like other funds.
>
> There is $80,000 still due the municipal funds from money borrowed to pay the shortage in the cost of the Twin Peaks and Stockton Street tunnels.
>
> There is $125,000 in an old compensation insurance fund that we believe should be made available for the payment of our increases.
>
> Then there is the $200,000 of the earnings of the road that go each year to the retirement of bonds. No other road is ever expected to pay off the original investment. If these items are placed to the credit of funds necessary to meet the increases granted us there will never be any need to raise the fares.

T. A. Reardon, president of the Board of Works, in justifying the second raise granted the carmen said:

> The street car men all started off on a $3 a day basis. During the war the car repairers and others got increases which were refused the platform men owing to their numbers. We have been trying to equalize them. Mayor Rolph is insistent that the platform men have the greatest amount of responsibility and should receive as much as the others. When the supervisors raised the car repairers and provided $50,000 we also raised the platform men.

Franchise Negotiations in Canton

Canton, Ohio, is now in the throes of a transportation problem. The Northern Ohio Power & Light Company, the local operator of railway service, will not consider continued operation unless the company is given the entire transportation privilege. A. C. Blinn, general manager of the company, has made it plain at all times to the City Council committee that the company was willing to quit if the Council could get some other responsible concern to take over the business and supply satisfactory service for less money. He said that whoever undertook the job should have all the business. There are thirteen independent, competing bus lines in the city.

The problem presented itself in Canton about a year ago when Mr. Blinn went there and in a conference with the Council suggested that it might be well to take up the question of the new franchise contract in view of the expiration of the old one in February, 1928. This conference led to the employment of the Beeler Organization by the city. Mr. Beeler and his assistants made a survey and filed a report suggesting a co-ordinated bus and rail system. The report provided for retaining the main car line arteries and for bus feeders.

Since the filing of the report, Mr. Blinn has had two or three conferences with the city relative to some plan for the continuation of service. The Chamber of Commerce and other organizations in the city do not want the car lines removed, but Mr. Blinn said that it was perfectly satisfactory to the company if the city could find some responsible concern to take over the city system. The city is not inclined to give the contract to any other company, but it has not indicated that it is willing to give the Northern Ohio exclusive operating rights.

The present fare is 6 cents with six tickets for 35 cents. There has been no discussion of future fares while negotiations are still in progress.

Service News, the official paper of the Northern Ohio Power & Light Company, compares the situation in Canton with that in Akron, solved a few years ago by the co-ordinated systems supplied by the Northern Ohio Power & Light Company.

$4,500,000 Railway Budget for New Jersey Company

Upward of $57,000,000 is available this year for new construction, extensions and improvements by the Public Service Corporation of New Jersey in the territory which that company serves. Of this sum $31,064,381 was authorized in the 1927 budget, the other $26,000,000 having been authorized in previous budgets and covers work now in progress. The electric operating department's portion of this year's budget is $25,461,578, of which sum about $2,500,000 will be used for the installation of the fifth unit of boilers, consisting of three of 2,360 hp. each, for the Kearny generation station. There are twelve boilers at the station now and the extra three will provide for the maximum output planned for the first unit of the plant.

The railway and bus transportation companies will spend about $4,500,000 for upkeep of properties, additions and alterations to plant and equipment. The largest item authorized is an appropriation for the purchase of about 200 new buses, contracts for which have not yet been awarded. The railway will spend approximately $1,500,000 for track reconstruction in various parts of the state and 450 new electric fare boxes will be bought for the transportation company.

Safety First in Booklet for Children

School boys and girls in Milwaukee, Wis., are being taught through a 32-page booklet that health, helpfulness and happiness are dependent, in a large measure, on safety first rules and their practice. The booklet, called "Safe at Play with Ned and May," has been prepared in the hope that it may show the children the way in which to avoid dangers of present-day traffic. While playing ball, the game of chase, coasting or roller skating, Ned and May and others learn how to play with safety. The booklet is replete with rhymes such as:

M is for Mindful
Of danger around,
So always be careful
Wherever you're bound.

The booklet concludes with a safety song, the last verse of which says:

Now our song is ended,
And if you are wise
You'll make a pledge to safety
And use your ears and eyes.

News Notes

Back to Five-Cent Fare.—The Public Service Commission of Kansas recently approved the return by the Union Traction Company of the 5-cent fare at Coffeyville. Application for such permission was made by Receiver Layng. About a year ago the rate was boosted to 8 cents, but the revenues of the company did not increase with the increased fares.

Twenty-five Cents in Conscience Fund.—Following Mel Trotter's spiritual meetings in Grand Rapids, Mich., the so-called conscience fund of the Grand Rapids Railway was increased by 25 cents. This amount came from a woman who wrote that she had ridden at one time on the cars without paying. Her decision was to pay the amount with interest. L. J. DeLamarter, vice-president and general manager of the railway, publicly acknowledged the amount with thanks.

Through Service Contemplated. — Negotiations are under way between the Milwaukee Electric Railway & Light Company and the City Council of West Allis, Wis., looking toward the establishment of a rapid transit line between West Allis and Milwaukee, together with the introduction of co-ordinated cross-town bus line service which would connect with the railway lines of the north and south sections of the city. The high-speed line project would give through transportation service with no stops once the car left the Milwaukee or West Allis city limits. This change would cut the running time considerably between the two cities. Under cross-town bus line service, the present time-consuming circuitous route between downtown Milwaukee and West Allis would be eliminated.

Engineer Opposes Shorter Headway.—A public hearing was held before the New York Transit Commission on Feb. 8, 1927, on the petition of Jamaica Central Railways, Inc., to modify the commission's order requiring a ten-minute headway on the Jamaica-Far Rockaway route. Ira W. Fisk of Fisk & Roberts testified as the company's consulting engineer to the impossibility of operating the ten-minute headway with existing sidings and introduced traffic analyses showing that present service was more than ample. The commission reserved decision.

West Penn Adds Another Weekly Pass.—The West Penn Railways on Jan. 17, 1927, installed the weekly pass at Uniontown, Pa. The pass sells for $1, against a cash fare of 8 cents and a ticket fare of 6¼ cents. This makes the third installation of local city weekly passes along the West Penn system. The first was put on at Connellsville on June 1, 1925 and the second at Greensburg on March 1, 1926. Weekly and Sunday passes have also been used for several years at other points of the West Penn and subsidiary railways, including a zone-pass installation between Kittanning and Ford City since Sept. 20, 1925.

New Rates in Fort Worth.—The City Council of Fort Worth, Tex., recently authorized the Northern Texas Traction Company to put into effect a new schedule of fare rates. This includes a 10-cent adult cash fare, three tokens for 25 cents and a weekly ticket for 40 cents plus 5 cents for each ride. Children, entitled to half fare, will ride for 5 cents and school children may purchase six tokens for 25 cents. The old cash fare in Fort Worth was 7 cents for adult cash passengers. In its application for a revision of its rates, the company explained that it was earning a net return on its investment of less than 2 per cent and that new money could not be secured with that meager showing of earnings.

New Contract Between Two Boston Companies.—An operating agreement has been entered into between the Eastern Massachusetts Street Railway and the Boston Elevated Railway, Boston, Mass., governing the use of the lines between Maverick Square in East Boston and Revere Beach. It provides for the operation of Eastern Massachusetts cars over the Boston Elevated rails into Maverick Square and by Eastern Massachusetts crews. The fare is to be 15 cents between that terminal and Revere Beach, and of this amount the Elevated is to have 10 cents and the Eastern Massachusetts 5 cents, but this fare carries with it a free transfer privilege to all the other sections of the Boston Elevated. So that these cars shall not take any of the exclusively Elevated company business, they are to operate without stops between Gladstone Street and Maverick Square.

Recent Bus Developments

Status of Purple Swan to Be Determined

Whether the United States District Court for the Eastern District of Missouri or the St. Louis Circuit Court shall determine the question of appointment of a receiver for the Purple Swan Safety Coach Lines will be determined by the federal court after a transcript of the record of the Circuit Court in the litigation involving the company's finances is filed. The transcript is now being prepared for the federal court. In the meantime the temporary receivership, which resulted from a suit filed against the company by the Seiberling Rubber Company of Akron, Ohio, has been lifted and the lines have continued operation under their own management.

The question of whether a permanent receiver for the company should be appointed was set for hearing on Jan. 6, but prior to that date the bus company filed a motion for removal of the case to the federal court. As a result the hearing of Jan. 6 was continued indefinitely. Recently Circuit Judge Hartman ruled against the petition for removal for transfer to the federal court. Following his ruling on this point the bus company ordered a transcript of the record in the proceedings so that the federal court can pass on the same question.

Officials of the bus company have denied that there is any occasion for the appointment of a permanent receiver for the company, saying that the lines have been successfully managed and are in good shape financially. They want the question passed on by the federal court because of the diversity of citizenship involved.

Some of the Purple Swan lines were operated in competition with the Blue Goose line. run by the East St. Louis & Suburban Railway.

Buses in Hudson

The Public Service Commission on Feb. 3 granted the petition of the Eastern New York Utilities Corporation (formerly the Albany Southern Railroad) and the Eastern New York Transportation Corporation for the abandonment of its railway lines in the city of Hudson and substitution of bus service thereon. A certificate was also granted for the operation of bus lines in Hudson and the town of Greenport and authorization was given for the issuance of $25,000 capital stock for the transportation company and its acquisition by the utilities company. Commissioner Lunn's memorandum accompanying the order said that the substitution of buses appeared to be a solution of an unfortunate situation and would enable the railway to discontinue a portion of its system that has for a number of years failed to meet operating expenses and at the same time furnish a service acceptable to the people of Hudson. At the hearing an exhibit was introduced showing that the local lines in the city of Hudson during 1926 earned $20,500 gross with total expenses of $28,693.

Washington-Annapolis Service Planned

The Washington, Baltimore & Annapolis Electric Railroad, with headquarters in Baltimore, Md., plans to start a bus service between Washington and Annapolis within the next few weeks. The service will be in addition to the rail service now in operation. Permission to establish the bus line has been granted by the Public Utilities Commission of the District of Columbia and the Maryland Public Service Commission. Three buses will be ordered, all of them of the latest de luxe type. At first it is planned to make three round trips daily from both cities, but officials of the company said that if necessary the number of trips will be increased. The service will be over the new National Defense Highway, which is nearing completion, and will provide bus transportation between all points along the thoroughfare.

Would Run Buses in Scarsdale

The Westchester Street Transportation Company, Inc., subsidiary of the Third Avenue Railway, New York, N. Y., on Feb. 3 petitioned the Public Service Commission for permission to operate buses on a portion of its route in the village of Scarsdale, Westchester County. This company operates the railway lines in White Plains and Scarsdale. On Oct. 18, 1926, White Plains consented to the substitution of bus service for street cars in that city for a period of five years and on Dec. 9, 1926, the commission granted an order approving the substitution. On Dec. 28, 1926, Scarsdale also granted similar consent, which the company now submits to the commission for approval.

The petition says that the proposed bus route and bus route of the Eastchester Transportation Company, another subsidiary, connect with each other at the dividing line of Scarsdale and the town of Eastchester. An arrangement has been made for through operation from White Plains and Scarsdale through the town of Eastchester, Tuckahoe and Winter Hill to Yonkers Avenue between Main Street and Bronx River. A public hearing will be held on the application.

Bill to Permit New York City to Fix Bus Fares

Under the provisions of a bill introduced in the Assembly on Feb. 2 by Emory F. Dyckman, Republican, of Brooklyn, a new section 68 is added to the transportation corporations law, providing when New York City consents to operation of bus lines for not exceeding ten years, including all renewals or extensions, such local authorities and person or corporation receiving such consent may, by agreement, fix rates of fare to be charged. The object of this measure is believed to be to overcome the provisions of a gratuitous opinion recently written by former Justice Hughes that even if a city entered into a contract with a transportation company on the matter of the fare to be charged the carrier could later appeal to the utility commissions for relief if it found the original fare condition to be onerous.

Detroit Mayor After Competing Buses

In an attack on buses which compete with the municipal service of Detroit, Mich., made by Mayor John W. Smith while speaking before city officials and members of the Grand River-Redford federation, the Mayor invited the City Council to oust the Detroit Motorbus Company from Detroit streets by abrogation of the day-to-day agreement under which it operates.

In reply to statements made by one of the Councilmen to the effect that the Department of Street Railways should use buses only as feeders for its street cars, and that paralleling of street cars and city bus service was unwise, the Mayor cited that the Detroit Motorbus Company was operating on a day-to-day agreement, which was entered into with the Common Council and stated that he would like to see "some big red-blooded friend of the people in the Council move to have that agreement abrogated." The Mayor further pointed out that privately owned buses and jitneys were running beside the city street cars, and furthermore, they were allowed to charge a 10-cent fare. Referring to the Street Railway Department, the Mayor pointed out that the department was giving fine service, that it paid its employees the highest wages in the country, and that for 7 cents a passenger might ride 37 miles. The Detroit Municipal Railway was meeting its financial obligations, including payments on the purchase contract for the system.

Accepting the Mayor's challenge to abrogate the agreement with the Detroit Motorbus Company, the City Council unanimously adopted a resolution asking the Mayor and the Street Railway Commission for information as to the negotiations being carried on between the city and the bus company. In introducing the resolution, one of the Councilmen expressed the opinion that it was for the Mayor and his Street Railway Commission to decide and inform the Council whether the day-to-day agreement with the Detroit Motorbus Company should be discontinued.

A later announcement attributed to Mayor Smith was to the effect that he was not advocating at this time the removal of the buses operated by the private bus company. Also, that the Councilmen were just as much a part of the city administration as was the Mayor's office, and had as much to do with the operation of buses of the private company on the streets as had the executive end of the government.

Would Run Two Lines.—The County Transportation Company, Inc., Port Chester, N. Y., filed a petition on Jan. 31 with the Public Service Commission for a certificate for the operation of two bus lines in Mamaroneck, N. Y. The petition alleges that the New York & Stamford Railway intends to acquire all of the capital stock of the company and that the New York, Westchester & Boston Railway is committed to the financing of requirements of the County Transportation Company, Inc.

Reports on Bus Situation.—E. R. Baker, accountant in the public utilities department of St. Paul, Minn., has presented a report of 150 pages on the bus and taxicab situation in the city to the bus committee of the City Council. Data are to be employed as a basis for recommendations for the Council on bus and taxicab routes and fares. The report includes data on the history of the newest subsidiary of the Twin City Rapid Transit Company, Minneapolis, Minn., as affecting St. Paul, a corporation which has taken over most of the taxicabs in the two cities, in Duluth and in Rochester, Minn.

Bill Would Increase Gasoline Tax.—On the ground that it now costs the state of Wisconsin about $550,000 to collect $9,000,000 in license fees, whereas it costs only about $10,000 to collect the $5,000,000 obtained in gasoline taxes, a bill is being prepared for presentation to the Legislature providing for an increase in gasoline tax from 2 to 5 cents. With the 5-cent tax a law, the registration fee would be reduced to $1 and the personal property tax abolished. Electric railway and independent bus operators are now paying the 2-cent tax.

New Bus Schedule in Effect.—The Illinois Traction System on Jan. 16 put into service a new schedule on its bus line between Edwardsville, Ill., and St. Louis, Mo. Several buses have been eliminated. The new schedule is as follows: Edwardsville to St. Louis, 8 a.m., 10: 50 a.m., 4: 50 p.m., 7: 30 p.m. and 10:50 p.m. St. Louis to Edwardsville, 6: 45 a.m., 12: 15 p.m., 3: 30 p.m., 6: 05 p.m. and 9: 30 p.m.

Transfers on "Beauty Specials."—To allow students of the Girls' High School at Atlanta who live in the territory served by the Morningside and Virginia-Highland coach routes of the Georgia Railway & Power Company to use the "Beauty Special" coaches, as the special coaches to and from the Girls' High School are called, transfers are being issued on all of the regular coaches which are accepted on the "Beauty Specials." Transfers are also being issued from the specials to the regular coaches. The plan was started with the recent reopening of school for the spring term. Already it has proved very popular with the students. The "Beauty Specials," which were started when the Girls' High School opened for the current year, have proved a good supplement to the regular railway service. The schedules are arranged so that the buses arrive at the high school just before opening time and leave shortly after closing. The coaches have proved a great convenience to students.

Financial and Corporate

Net Income of Texas Electric Decreases

The gross earnings from operation on the Texas Electric Railway, Dallas, Tex., for the year ended Dec. 31, 1926, were $2,036,859, compared with $2,362,114 for 1925. The gross earnings were made up from the following principal items:

Passenger transportation	$1,692,142
Mail	26,827
Express	258,279
Rents of tracks and terminals	32,005
Rents of buildings and other property	14,395
Miscellaneous	13,209

Operating expenses and taxes for the year totaled $1,360,118, compared with $1,524,615 for 1925. Included in this decrease is an allowance of $15,000 made to the company by the Texas Power & Light Company upon power bills for the last half of the year. The item of taxes included in the above figures was $99,725 for the year, compared with $122,123 for the preceding year. The net income for the year was $250,769, compared with $411,763 for the year of 1925. These facts are contained in the annual report to the stockholders for the year ended Dec. 31, 1926.

INCOME ACCOUNT OF THE TEXAS ELECTRIC RAILWAY FOR YEAR ENDED DEC. 31, 1926, AND SUMMARY OF SURPLUS ACCOUNT

INCOME ACCOUNT		
Gross earnings from operations		$2,036,859
Operating expenses and taxes		1,360,118
Net earnings from operations		$676,740
Add-Interest on bank balances		1,853
Total net earnings before depreciation		$678,594
Interest deductions		427,825
Surplus net income before depreciation		$250,769
SUMMARY OF SURPLUS ACCOUNT		
Balance Jan. 1, 1926, per previous report		$1,354,614
Add: Surplus net income before depreciation for the year ended Dec. 31, 1926, as above	$250,769	
Less—Provision for depreciation (retirements)	100,000	
	$150,769	
Sundry direct items—		
Discount on Texas Traction Company bonds purchased doe sinking fund	$13,688	
Less—accrued rent for express terminal charged off	4,875	$159,583
	$8,813	$1,514,197
Deduct:		
Dividends declared on first preferred stock		29,957
Surplus balance, Dec. 31, 1926, per balance sheet		$1,484,240

Despite declining receipts and the necessity for the most rigid economy, the physical condition of the property was well maintained during the year. Under its mortgage the company is required to spend annually 15 per cent of its gross revenue for the maintenance of roadway and equipment. During the year expenses for these purposes were $351,950, or $46,421 in excess of the mortgage requirement. The company spent for additions, renewals and improvements to its property the sum of $95,477, including construction work and renewals of poles and cars. There was taken out of property value the price of $1,000 for certain lots sold and the sum of $1,368, representing certain railway construction abandoned in the city of Sherman.

Changes have occurred in the securities of the company during the year as follows: The outstanding underlying Texas Traction Company 5 per cent sinking fund bonds were reduced by the amount of $93,000 by the purchase of that amount through sinking fund accumulations; the company has now outstanding 6 per cent gold debentures to the amount of $1,348,000, a reduction of $2,000, representing an exchange during the year of debentures for first preferred stock; this exchange increased the amount of outstanding first preferred stock to $1,712,000; Texas Traction Company bonds in the amount of $4,000, par, held by the trustee of Texas Electric Railway mortgage and pledged under that mortgage were sold to the sinking fund of the Texas Traction Company; second preferred stock of the company in the par amount of $47,000, heretofore sold by the company to employees, has been repurchased by the company.

During 1926, the company discontinued railway service at McKinney and upon Mulberry Street in Sherman because the receipts therefrom were insufficient to provide for the service given.

Bus competition continued throughout the year upon substantially the same basis as it was at the close of the preceding year. The company experienced competition of this kind paralleling its lines between Dallas and McKinney, a distance of 32 miles, and between Waco and Hillsboro, a distance of 33 miles. The fare charged by bus service between Waco and Hillsboro is the same as the fare by interurban. Between Dallas and McKinney the bus fare during the year was advanced from 50 cents to 75 cents, while the interurban fare between these two points has been maintained at $1.

The address to the stockholders by Jack Beall, president, made a plea for legislation exempting interurban and street railways from a tax upon their gross receipts, legislation, calling for regulation of truck and bus operation and legislation requiring automobiles to stop before going over the railway crossings.

The report also estimated cash requirements for 1927, which, without considering the floating indebtedness of approximately $164,000, totals $1,871,718. This includes operating expenses, of $1,230,000; taxes, $100,000; interest, $409,855; sinking fund requirements, $81,550; payment of Denison & Sherman Railway bonds due July 1, $50,313. In addition it includes approximately $100,000, required during the year to take care of renewals and replacements and for new construction. In other words, there will be required during the year to pay operating and other necessary expenses and charges, including renewals and replacements and improvements, approximately $1,971,718. For the company to meet these charges and to enter 1928 free of floating indebtedness about $2,135,718 will be required, whereas the gross receipts for the year were $2,036,859.

California Railways Hit by Tax Ruling

Unless a tax decision rendered in Sacramento, Cal., on Jan. 27 by Superior Judge Peter J. Shields is upset by appeal, many electric railways in California may be seriously embarrassed. Judge Shields held that the separate class taxation is unconstitutional and ruled that all steam and electric lines should pay the 7 per cent rate. The decision was the result of a suit brought by the Southern Pacific on behalf of some of its electric lines to reduce the state tax rate for those lines. Under the King bill, which has been a law since 1921, electric lines have been assessed at the rate of 5½ per cent, while steam lines and former steam lines have been assessed 7 per cent. The Southern Pacific in its suit sought to put its electric lines, which were formerly steam lines, under the lower tax rate.

The back taxes due the state under this decision amount to more that $2,500,000. A meeting of electric railroad men from all parts of California was held in San Francisco on Jan. 31 and a committee was appointed to study the situation and report at a future date.

Valuation of Capital Traction Cut

The valuation of the Capital Traction Company, Washington, D. C., for rate purposes was fixed at $25,756,880 by a decision of the District Court of Appeals rendered on Feb. 7. The appellate tribunal, through Chief Justice Martin, modified the decision of Justice Hoehling of the District Supreme Court by disallowing a claim of the company for $5,150,000, for the purchase price of the franchises and good will of the old Washington & Georgetown Railroad by the Rock Creek Railway, from which merger the Capital Traction Company was created in 1895. Justice Hoehling had sustained the claim of the company and had fixed a total valuation of $30,906,880.

The Public Utilities Commission had noted an appeal from the decision of Justice Hoehling and contested the allowance of the $5,150,000, which the commission had refused to consider when, in September, 1919, the commission reported its finding fixing the company's valuation as of June 30, 1919, at $14,270,495. This valuation was based on the normal prices as of July 1, 1914.

In disallowing this amount Chief Justice Martin declared it was a speculative price paid for the stocks and bonds of the company and should not have been paid for the franchise and good will of that corporation any more than should payment have been made to the holders of the securities of the Rock Creek Railway for its good will and franchises. The court declared it made no charge of bad faith respecting the merger, but pointed out that $8,000,000 was paid for the outstanding bonds of an issue of $4,000,000, three-fourths of which were redeemable within four years and one-half of the remainder in less than eight years thereafter.

Taking up the claim of the commission that Justice Hoehling had not provided any deduction for depreciation, which the experts for the commission had estimated at $2,000,000, the appellate tribunal adopted the decision of Justice Hoehling that no depreciation figures be set. The court ordered the commission and its successors in office to modify forthwith its former valuation and order in accordance with the decision of the appellate tribunal.

George E. Hamilton and G. Thomas Dunlap, counsel for the Capital Traction Company, announced they would take an appeal to the Supreme Court of the United States.

Receiver Appointed for Cincinnati-Portsmouth Road

The Cincinnati, Georgetown & Portsmouth Railroad, Cincinnati, Ohio, was placed in the hands of L. E. Woster as receiver when Judge Struble acted upon a suit brought by the Union Trust Company, holder of the trust indenture and first mortgage given by the company when it issued $1,000,000 in 5 per cent bonds. Mr. Woster is superintendent of transportation of the company.

J. P. Longon, attorney for the Union Trust Company, alleged in the suit that the railroad had failed to meet installments of interest, aggregating a large sum, due on its million-dollar bonded indebtedness. The petition said:

> For more than a year past the earnings of the company from all sources, in excess of the cost of operation, maintenance and other necessary expenses, have been far less than the amount required to enable it to pay the interest upon the bonds and other obligations.

Because of the alleged insolvency of the railroad there was danger of disruption of the system, the trust company asserted in its suit. In this connection it explained that:

> It is of vital importance not only to the holders of the bonds and of the other obligations of the railroad, but also to the public that the operation of the system should not be interrupted or disorganized until the rights of the various bondholders and creditors can be ascertained and an opportunity given for some reorganization or readjustment of the properties.

Increase in Revenue Passengers in Syracuse

The Syracuse lines of the New York State Railways carried a total of 33,458,417 passengers during 1926, an increase of 250,000 revenue passengers over the preceding year, according to a report issued by Benjamin E. Tilton, vice-president and manager. The report covered both the electric railway and bus systems. While the annual financial report is not completed, Mr. Tilton said the gross passenger revenue for electric cars would reach $2,222,000 and for buses the figure was set at $132,770, a total of $2,354,770.

Street cars carried 31,604,430 and buses 1,853,987. The street cars traveled more than 5,000,000 miles and the buses 525,000 miles. Total number of transfers issued was about 6,000,000.

Mr. Tilton announced that the chartered bus business instituted by the Syracuse lines during the year had proved profitable. Buses were chartered on 72 occasions, or about twice a week since the system was installed. Parties were taken to Binghamton, Buffalo, State College, Pa., northern New York and many other points.

Sale of Indiana Road Approved

The Indiana Public Service Commission has approved the purchase of the property and franchises of the Fort Wayne, Van Wert & Lima Traction Company, Fort Wayne, Ind., by the Fort Wayne-Lima Railroad. The road was bought recently at receiver's sale by Edward Hopkinson, Jr. The commission authorized an issue of $100,000, par value, of 6 per cent fifteen-year first mortgage bonds; $441,000, par value, of general mortgage bonds, and 10,290 shares of no par common stock.

In this connection it is interesting to note that in a recent opinion to John W. McCardle, chairman of the Indiana commission, Arthur L. Gilliom, Attorney-General, held that state laws provide sufficient authority for one utility to take over the property and franchises of another public utility operating in Indiana and an adjoining State, and that the only authority necessary from the commission in such a case is approval of any bond issue asked by the purchasing utility.

Mr. McCardle based his question on a petition by the Fort Wayne-Lima Railroad to purchase the Fort Wayne, Van Wert & Lima Traction Company and to issue $641,290 in securities. Mr. Gilliom pointed out that since the railway was recently sold at a judicial sale and that since the law requires the purchaser at a judicial sale, if not a corporation, to organize one, the law gives the new corporation authority and the matter does not rest with the commission.

Hydro May Take Windsor, Essex & Lake Shore

Announcement that the Windsor, Essex & Lake Shore Electric Railway, Windsor, Ont., plans to shut down within 60 days has provoked much comment in the border cities. Following a recent meeting at Kingville attended by civic leaders it was decided that a complete survey of the situation be made with a view toward its possible purchase by the Ontario Hydro-Electric Commission for operation as a part of the Hydro radial services. A tentative price was not mentioned. W. R. Robertson, superintendent of the Hydro lines, reviewing the situation and contrasting bus operation with radial service, believed the Hydro department could operate the Lake Shore road at an estimated annual saving of $100,000. He cited the reduced cost of power as an important consideration. He set the costs of bus operation at 40 per cent higher than radial overhead.

Chicago "L" Issue Going Well

The sale of the new issue of $1,500,000 of prior preferred stock of the Chicago Rapid Transit Company, operating the elevated lines, is now in progress through the Utility Securities Company, Chicago. The new stock, which pays a rate of return of 7.2 per cent, or 60 cents a share a month, is proving a popular investment with middle class investors. It is being sold on the monthly payment plan, as was the former issue, 7 per cent interest being allowed on partial payments. The monthly payment is $10 a share and the stock is being sold at $100 a share. The previous issue of prior preferred is now quoted on the Stock Exchange at several points above par.

Power Equipment of Detroit United Sold

One of the largest sales of its kind in recent years has been announced in Detroit by the receivers for the Detroit United Railway, who have disposed of idle equipment, including four power houses and twelve substations, to the Woodmere Scrap Iron & Metal Company, Detroit, for $800,000. An order in federal court disposing of the equipment was signed by Judge Charles C. Simons.

The steam and electrical power equipment included in the deal was valued at several million dollars when installed many years ago. The main power plants have been idle for the past two years. They are located at Monroe, Rochester, Farmington and New Baltimore. The substations are at Oxford, Conger, South Rockwood, Erie, Earthville, Roseville and two at Atlas.

New Incorporation at Rockford

The Rockford & Belvidere Railway has been incorporated with $300,000 capital. The stock includes 3,000 shares of common at $50 a share and 1,500 shares of preferred at $100. T. M. Ellis is president, William D. Bangs vice-president, Paul V. Harper secretary and John P. Brown treasurer. Offices of the company are at 128 Kishwaukee Street, Rockford, Ill. The corporation is operating the former Rockford-Belvidere branch of the Rockford & Interurban Railway, which, with the Rockford City Traction Company, went into bankruptcy a year ago. Both units were taken over by the Ellis interests.

Net Profit $5,271 in 1926.—The net profit of the Worcester Consolidated Street Railway, Worcester, Mass., dropped from $349,735 in 1925 to $5,271 in 1926, principally because of decline of patronage of its lines and increased operating expenses, according to a report filed with the Massachusetts Department of Public Utilities. In 1925 the railway carried 36,781,407 revenue passengers, while in 1926 the total was only 33,870,220. The railway shows that its operating revenue for the year 1926 amounted to $3,338,544, compared with $3,595,403 in 1925. Although operating revenues declined, operating expenses increased nearly $160,000, being $2,903,725 in 1926 compared with $2,745,002 in 1925. All items of expense except conducting of transportation, which includes wages, increased in 1926 over 1925. As a result of the diminution of profits the railway paid no dividends in 1926, while $348,750 was distributed in dividends in 1925.

The Situation in Chicago Traction Negotiations

Failure of the Chicago Railways to pay off the principal of $55,655,000 of its first mortgage gold bonds on Feb. 1, the date its 20-year franchise with the city of Chicago expired, resulted in the initiation of proceedings the following day in the Federal District Court for the foreclosure of the mortgage by the Harris Trust & Savings Bank, acting as trustee for approximately 50 per cent of the bondholders. There was no contest against the contentions of the bill and the foreclosure was immediately ordered by Judge James H. Wilkerson. The petition asked the court to declare the first mortgage claim a valid first lien and sell the property as an entirety to satisfy it. In the meantime, the court was also asked to have the receivers hold all profits for the trustee and to restrain the company agents and receivers from transferring the property.

In granting the application, Judge Wilkerson also ordered consolidation of the proceedings with the receivership suit of the Westinghouse Electric & Manufacturing Company, which on Dec. 15 appealed for appointment of the present receivers on account of failure to pay a bill of $67,000. The same receivers—John J. Mitchell, Frederick A. Rawson and Henry A. Blair—were reappointed.

Although the court took no legal action on the application for sale of the properties, the natural sequence of this petition is that the company will be given 20 days to make answer. During that time, a formal hearing will be held on the merits of the appeal. With no funds in the treasury to meet the principal of the bonds now due, the property will be ordered sold at the expiration of this period.

Reorganization of the system contemplated by the controlling bondholders, however, will have to wait until the city either passes a new ordinance or the state Legislature passes the necessary legislation, it is believed. If the city grants a new franchise, of either terminable or fixed duration, the main problem is one of refunding. Under existing laws the city may only grant a twenty-year franchise. The companies contend it is impossible to fund present indebtedness under a limited grant. If the city is willing to coincide with that view, then it is predicted both parties will join in a plea of the state Legislature for the necessary enabling laws to permit the granting of an indeterminate permit.

Holders of some $40,000,000 par value of junior bonds of the Chicago Railways and of $39,455,000 first mortgage bonds of the Chicago City Railway and Calumet & South Chicago Railway, which also fell due on Feb. 1, as yet have made no formal demands for payment of their investments.

The aggregate funded debt of the Chicago Railways Company, as shown in its latest published report, is as follows:

First mortgage	$62,785,000
Consolidated mortgage Series A.	16,703,800
Consolidated mortgage Series B.	17,164,475
Purchase money mortgage	4,073,000
Adjustment income mortgage	2,500,000
Underlying securities	1,980
Total	$103,228,255

Of this amount, approximately $8,594,000 of bonds are unsold and still remain in the company's treasury, leaving a total of $94,634,185 in the hands of the public.

Because the bondholders will be interested in protecting their property, the local transportation committee of the City Council recognized their right to be represented at future hearings on all traction ordinances by postponing further sessions until after the bondholders come into control of the property. That numerous aldermen are now in the midst of heated campaigns for re-election on Feb. 22 is also given as another reason for the recess.

Petition Dismissed.—The California Railroad Commission has dismissed the application of the Union Traction Company for authority to abandon its stage lines operated between Santa Cruz and Capitola and intermediate points and between Santa Cruz and Twin Lakes and intermediate points.

Deficit on Lake Shore.—The gross earnings of the Lake Shore Electric Railway, Cleveland, Ohio, for the period from Jan. 1 to Nov. 30, 1926, was $2,947,274, against $2,924,613 for a similar period the year previous. Operating expenses and taxes increased from $2,416,604 to $2,554,098. After the consideration of interest the company concluded the eleven months period with a deficit of $14,197, against a surplus the year previous of $113,496. The Lake Shore Electric Railway has asked permission of the Ohio Public Utilities Commission to discontinue railway service on its line from Sandusky to Norwalk, Ohio.

Net Income Lower.—The operating revenues of the Eastern Massachusetts Street Railway, Boston, Mass., for December, 1926, were $927,815, compared with $850,448 for December, 1925. The net income for December after taxes, charges and depreciation was $102,548, against $112,711 in December, 1925.

New Preferred Stock Issue.—The directors of the Midland Utilities Company, Chicago, Ill., on Jan. 17 authorized the issuance and sale of $1,000,000 of its 7 per cent cumulative class A preferred stock. Public offering of this stock will be made at once by the Utility Securities Company, Chicago. The Midland company owns or controls companies serving 201 communities in northern Indiana and western Ohio with an estimated population of 850,000. The total investment of the subsidiary companies in properties is $94,318,673. The chief transportation subsidiaries of the Midland Utilities Company are the Chicago, South Shore & South Bend Railroad, Gary Railways, Shore Line Motor Coach Company, Indiana Service Corporation and the Marion & Bluffton Traction Company.

Book Reviews

Accounting Procedures for Public Utilities

By Warren G. Bailey, M.A., and D. E. Knowles, C.P.A. Chicago and New York: A. W. Shaw Company. 459 pages. Price, $7.50.

This is a massive volume. It runs to the extent of 459 pages. This is not said as a deterrent, but is intended merely to convey an idea of the extent to which the authors have gone in covering their subject. To do the contents of the book full justice in a review of this kind would be impossible. Limitations of space make a critical summary of the volume out of the question. It seems better unequivocally to indorse the work as a whole and then to attempt to summarize the purpose of the authors and to convey an idea of the contents of the volume.

The present volume is the first of the series of so-called Public Utility Text to be published under the auspices of the Institute of Research in Land Economics and Public Utilities with Richard T. Ely, editor-in-chief, and Herbert B. Dorau, managing editor. This series is intended to cover the entire field of public service company operation and management. One finds himself heartily in agreement with the editors that as a study in a special aspect of public service company business administration "Accounting Procedures for Public Utilities" represents a real and valuable contribution to the literature on utilities.

As for the authors, who dedicate the volume to the public utility accountant, whose importance in the industry has been underestimated and whose work is essential to the proper management of utility companies, they have sensed the need for a reference book that would in a satisfactory manner review briefly the accounting practices in utility companies. As they point out, the compilation of accounting and financial data is logically the function of the accountant. To assemble these data accurately, the forms, methods and procedures he uses must be appropriate and complete. To this end the authors have attempted to describe the accounting records that have been found necessary, to explain briefly the manner in which the records are kept and to indicate the purposes for which the accounting information is used. In most instances the procedures presented are a composite of those used in various companies. In a few instances only are more or less specific practices discussed. It has been felt by the authors that procedures discussed or presented in a general way would be of greater assistance to executives and students of accounting than would procedures of particular companies. The authors warn the reader, however, that few records and practices used effectively in any one company can be used successfully *in toto* in another company.

There is, of course, a certain futility about giving a list of chapter headings. Yet in a review, fixed as to space limitations, there is, perhaps, no better way to convey an idea of the contents of a volume of this kind, particularly a business book. So the headings of the chapters are appended:

(1) Introduction; (2) Place of Accounting in Public Utilities; (3) Uniform Accounting for Utility Companies; (4) General Accounting Books; (5) Expense Accounting; (6) Timekeeping and Pay-Roll Methods; (7) Distribution of Labor Charges; (8) Departmental Responsibilities in Accounting for Materials; (9) Accounting for Materials and Supplies; (10) Plant Accounting; (11) Current Liabilities; (12) Revenues from Utility Services; (13) Revenue Accounting for Electric, Gas and Water Services; (14) Accounting for Merchandising Sales; (15) Accounting for Revenue of Electric Railways; (16, 17, 18 and 19) Customers' Accounting; (20) Accounting for Customers' Payments and Petty Cash; (21) Accounting for Refunds and Adjustments with Customers; (22) Auditing Procedure; (23) Budget Procedure; (24) Interpretation of Financial and Operating Statements; (25) Public Utility Construction and Extensions; (26) Accounting for Capital Stock and Dividends; (27) Accounting for Capital Stock Sales.

As a piece of bookmaking the volume is in consonance with the text. All in all, the book reflects great credit on the authors, the editors and the publisher.

Notes on the Collection of Transfers

By Frank Folupa. Philadelphia, Pa.: Dorrance & Company. 306 pages. Price $2.

Are you a peridromophile? You need not consult the psychoanalysts or the behaviorists for an answer to this question, for its field is new even to them. Only you yourself can settle the mooted point. Did you ever impulsively or with studied malice pay an extra fare on the street cars rather than relinquish the orange-colored, mysteriously marked and deliberately punched transfer? If so, you are a believer in the science of "peridromophily," the name assigned by Frank Folupa in his "Notes on the Collection of Transfers" to the habit of collecting transfers.

Few people in this workaday world see anything of beauty in a street car transfer, evidenced by the various drastic changes the forms undergo before being deposited in the hands of the waiting conductors or receptacles. Not so do these specially colored slips, with their listings and punches, affect the transfer collector. This particular one has more than an academic interest in the origin of transfers. He is especially intrigued with their destiny—namely, personal collection—and this hobby he constantly reminds his readers is not for fraudulent purposes but rather as an honest avocation. Why, he wonders, should not the collecting of transfer forms be just as interesting as collecting coins and stamps. Besides, transfer collecting has this advantage—it can never be commercialized, "since trading in transfers is illegal. . . . Therefore, collectors must always be amateurs collecting for the intrinsic interest in it."

And if the avocation of the collector is honest, it is delightful, too, he finds. On transfer forms one can be transported into the unbounded realms of history and knowledge, although these same slips appeared at first commonplace and stodgy. On this point he says: "A trolley ride along the traditional route or close to it, with a souvenir in some such form as a transfer used in Lexington, can add some interest to the history of Paul Revere's ride. A collection of Washington transfers seems to make news from the capital seem a bit more realistic, especially such forms as mention well-known places like the Capitol, the Treasury, Pennsylvania Avenue."

To one concerned in transportation questions or to one who has already acquired an interest in collecting transfer forms, this book should be of inestimable value. It is a carefully prepared, technical treatise on transfer privileges and classifications. Fare limits, overlaps, reversibility, direction punches, square box type, Ham type, Pope type and other equally perplexing terms to the layman are treated at considerable length. Supplementing the text are appendices dividing the United States into geographical divisions and subdivisions as a sample of a code notation of transfer systems.

But granting the reader has never found inspiration in transfers and will likely never indulge in the transfer-collecting hobby, the book contains entertaining and instructive matter. Even a cursory glance may be productive of reminiscent moods in which transfers played some part, though that part was negligible. Some such nostalgia affected one reader of a review published in a New York daily. Through the reviewer he subsequently offered to the author of "Notes on the Collection of Transfers" his own collection dated 26 years ago. Just a mention of this hobby was enough to carry him back to the days of his boyhood, when he and other kids in the neighborhood awaited the return of their traveling salesmen fathers, who in a big-hearted way dumped out of their pockets transfers from San Francisco, Louisville, Boston, St. Louis and several other cities. If the wandering transfers could have told their tales, . . . when will we have the autobiography of a transfer?

The Rapid Transit Situation in Greater New York

Many persons other than New Yorkers will be interested in this booklet of 70 pages, which contains the open letters of G. M. Dahl, chairman of the board of the Brooklyn-Manhattan Transit Corporation, on the Greater New York transit situation written during December, 1926, and January, 1927, to the Transit Commission of the State of New York and the Board of Estimate & Apportionment of the city of New York.

Mr. Dahl explains that the letters were written with the sole purpose of creating constructive discussion of local transit matters, and to aid in bringing about a co-operative effort on the part of existing transit companies and city and state officials for a solution of the transit problem, equitable alike to all interests—the public, the city and the companies.

Personal Items

Luke C. Bradley Heads New Providence Company

Luke C. Bradley, Richmond, Va., has accepted the invitation of the board of directors to become president of the Rhode Island Public Service Company, Providence, R. I. He will succeed Louis C. Gerry, and will assume his new duties about Feb. 20.

Mr. Bradley has resigned as president of the Virginia Electric & Power Company to accept this position. As head of the Service Company he will supervise the operations of the Narragansett Electric Light Company and the United Electric Railways, which have been merged under the Service Company.

Mr. Bradley has been associated with Stone & Webster, Inc., for the past 22 years in executive capacities. As president of the Virginia Electric & Power Company he had direct oversight of the electric light and power properties, electric railway lines, bus systems and gas properties in Richmond, Norfolk, Portsmouth, Peterburg, Fredericksburg and other cities in Virginia and extending into northeastern North Carolina.

The Virginia Electric & Power Company is controlled by the Engineers Public Service Company, and is under the executive management of Stone & Webster, Inc. Stone & Webster are also interested in the New England Power Association, which controls the Rhode Island Public Service Company. Mr. Bradley will be elected a director of the New England Power Association. He has been executive vice-president and division manager of the utilities properties under the management of Stone & Webster in Louisiana, Texas, New Mexico, Wisconsin, Nebraska, Wyoming and Colorado, serving about 100 cities and towns in these states. He is severing his connection with Stone & Webster in becoming connected with the Rhode Island Public Service Company.

Fred Hamilton President in Omaha—Other Changes

At the annual meeting of the Omaha & Council Bluffs Street Railway, Omaha, Neb., held on Jan. 10, a change in officers was effected as follows:

Fred Hamilton was elected president, succeeding W. A. Smith.

R. A. Leussler, formerly a vice-president and the general manager, will continue as general manager and assume the first vice-presidency.

J. A. Munroe, formerly vice-president, is now designated as second vice-president.

The new president, Fred Hamilton, has been a member of the board of directors of the company for the past seven years, and during 1926 was first vice-president. He is well known in banking circles, being president of the Merchants National Bank until the consolidation of that bank with the Omaha National Bank last April. He is at present vice-president of the Omaha National Bank.

M. Ackerman Heads C.E.R.A.

Martin Ackerman, general manager the Lake Shore Electric Railway since Feb. 1, 1926, was elected president of the Central Electric Railway Association at its meeting in Toledo, Ohio, on Feb. 3-4, 1927. Mr. Ackerman is well known in the Central West, particularly for his affiliations with the Cincinnati & Dayton Traction Company and the Lake Shore Electric Railway.

In accepting the general managership of the Cleveland interurban a year ago he returned to the property on which he obtained his early electric railway experiences. Here he started at the bottom, receiving in the course of time many advancements. Early in his career he was identified with the Youngstown & Ohio River Railway, and later with the Springfield & Xenia Railway and the Interurban & Terminal Company at Cincinnati. As a result of his efficient handling of the latter property Mr. Ackerman was made general manager of the Cincinnati & Dayton Traction Company in July, 1918. He encountered many difficulties, but his efforts at restoration did bear much fruit. He remained with this railway until Feb. 1, 1926, when he went to Sandusky as head of Lake Shore. At that time his career was reviewed in the ELECTRIC RAILWAY JOURNAL, issue of Feb. 6, page 268.

Martin Ackerman

Changes in Personnel of American Light & Traction Company

Alanson P. Lathrop, president of the American Light & Traction Company, New York, since 1909, has been elected chairman of the board of directors. R. B. Brown, who had been vice-president and general manager of the Milwaukee Gas Light Company several years, has been made president to succeed Mr. Lathrop.

W. E. Wood Made President at Richmond

William E. Wood, who has served as vice-president and general manager of the Virginia Electric & Power Company, Richmond, Va., since operation and control of the properties were taken over by Stone & Webster, Inc., Boston and New York, in 1925, will become president of the company, succeeding Luke C. Bradley. J. Frank McLaughlin, in charge of the company's Norfolk division, will succeed Mr. Wood as first vice-president, retaining his headquarters in Norfolk.

Mr. Wood joined the Stone & Webster organization immediately on graduation from the Georgia Institute of Technology. After a few months in the company's Boston offices he was sent to Jacksonville, Fla., where he eventually became superintendent of transportation. His promotion was rapid. Both Mr. Wood and Mr. Bradley came to Richmond in June, 1925, from highly successful management of the Stone & Webster properties in Texas, and they are now completing a $20,000,000 program of improvements and extensions for the Virginia Electric & Power Company in Tidewater Virginia and northeastern North Carolina.

Changes in Personnel of the Capital Traction Company

Edwin P. Goucher, formerly assistant engineer, has been appointed engineer of way and structures, and Joseph H. Dierken, formerly head of the electrical department, has been made electrical engineer of the Capital Traction Company, Washington, D. C.

Mr. Goucher has had charge of track construction for the Capital Traction Company for several years and has started some very valuable methods of construction which have materially reduced costs. His application of labor-saving tools in this work has shown remarkable results. He is a graduate of public schools and technical high school of Washington, D. C. For six years he served as assistant engineer in the surveyor's office in the District of Columbia. In 1917 he worked as assistant engineer at the United States Naval Academy, Annapolis, Md., on construction work and joined the engineering force of the United States Navy in 1918 as inspector of construction, Philadelphia Navy Yard. A year later Mr. Goucher was appointed assistant engineer in the way department of the Capital Traction Company.

Mr. Dierken entered the service of the Capital Traction Company in 1909 in the electrical department. He was appointed chief electrician in 1917. During the past five years he has had entire charge of the electrical department. Mr. Dierken is a graduate of Georgetown University Preparatory School, St. John's College, and Bliss Electrical School of Washington, D. C. In 1906 he served with the J. G. White Company and in 1907 and 1908 with the Westinghouse Electric & Manufacturing Company's construction department.

E. J. Anderson Advanced at Davenport

E. J. Anderson, formerly general superintendent of the Tri-City Railway, Davenport, Iowa, has been made general superintendent of both the Tri-City Railway of Illinois and the Tri-City Railway of Iowa, with offices in Rock Island.

Arthur Grunwald, formerly assistant superintendent in Davenport, is made division superintendent of the Iowa lines under Mr. Anderson.

John Arnell continues as division superintendent of the Illinois lines.

Frank V. Skelley, for several years an assistant under T. C. Roderick former general manager of the Illinois lines but now at Ottumwa, is made transportation engineer for the entire Tri-City Railway lines.

H. W. Blake Goes Abroad

Henry W. Blake, senior editor of the ELECTRIC RAILWAY JOURNAL, sailed for Europe on Feb. 10 on the *Conte Biancomano* on a business and pleasure trip that will extend over a period of several months. He expects to arrive in Naples on Feb. 22 and will proceed thence to Rome, Florence, Milan, Nice, Paris, Brussels, Berlin, Hamburg and London. Mr. Blake will travel leisurely, as bespeaks the scholar that he is, studying and drawing upon the background of previous trips and the inherent culture that is his. He will contribute to the JOURNAL some of his observations on public utility practices, particularly in the field of city railway operation and heavy electric railroading.

D. A. Powell at Muskegon

D. A. Powell was recently elected vice-president and general manager of the Muskegon Traction & Lighting Company, Muskegon, Mich. From November, 1925, until his recent appointment Mr. Powell was employed by the American Light & Traction Company, as traveling engineer. He is a graduate of the University of Wisconsin, 1907, with a degree of bachelor of science, school of electrical engineering. Upon graduation, he entered the employ of the Madison Gas & Electric Company as chemist, cadet engineer, and engaged in construction work and plant appraisal for rate-making purposes. In 1910 he was transferred to the Milwaukee Gas Light Company and was employed by this company until 1925. During that time he acted in the capacity of construction engineer and later he served as engineer of distribution.

R. R. Cheever, associated for many years with the Pacific Electric Railway, Los Angeles, Cal., was recently appointed to the position of the assistant chief clerk in President William Sproule's office. For the past six years he had been secretary to Mr. Sproule. He entered the service of the Pacific Electric Railway in Pasadena in 1906 as stenographer in the superintendent's office and was advanced to similar positions in the general manager's office and later in the office of the vice-president. Subsequently he was secretary to Paul Shoup, at that time vice-president of the Pacific Electric. Following this assignment he became chief clerk in that office. Before going to San Francisco, in 1920, Mr. Cheever was secretary to H. B. Titcomb, who was then vice-president of the Pacific Electric Railway.

Lewis E. Gettle, chairman of the Wisconsin Railroad Commission since 1922, at which time he succeeded Carl D. Jackson, resigned, has been reappointed by Governor-elect Zimmerman. His new term will expire in 1933.

Ray A. Poteracke, head bookkeeper of the Grand Rapids Railway, Grand Rapids, Mich., has been promoted by Vice-President and General Manager DeLamarter to chief clerk in charge of accounting. Mr. Poteracke entered the service of the company ten years ago as a storeroom clerk.

T. F. Gnevo, former general agent of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has assumed the duties of assistant general passenger agent of the North Shore Line with offices at Milwaukee, Wis., to which position he was recently appointed. Mr. Gnevo succeeds R. S. Amis, who has been promoted to general passenger agent. The new assistant general passenger agent has served as passenger traffic representative on various steam and electric railways for the past eighteen years.

Hazen J. Payette has resigned as secretary to Mayor John W. Smith of Detroit, Mich., to become chief trial attorney for the Detroit Department of Street Railways. Following the close of the World War, Mr. Payette joined the claims department of the Detroit United Railway and when the Detroit United lines were taken over by the city of Detroit he entered the employ of the city, serving the Department of Street Railways in a legal capacity. He remained with the department until nine months ago, when he became secretary to the Mayor. He is 28 years old. He was graduated from the University of Detroit law school.

R. E. Jamieson, for the past year district passenger agent for the Chicago, South Shore & South Bend Railroad, South Bend, Ind., was recently appointed district passenger agent with offices in Chicago. Mr. Jamieson's experience in railroading began in 1911 with the Grand Trunk System at London, Ont. Since that time he has been engaged in various capacities in passenger solicitation work. He was connected with the Canadian Pacific Railroad in Chicago prior to his service with the South Shore Line. He was elected president of the Chicago Passenger Club, an organization of electric and steam railroad and steamship passenger agents, at its annual meeting in December, 1926.

James H. Powell, formerly assistant superintendent of transportation of the Scranton Railway, Scranton, Pa., has been appointed superintendent of transportation. He succeeds in that capacity George C. Towle, recently resigned. Mr. Powell has risen from the ranks.

A. I. Hunter has replaced L. Stinson as vice-president of the Grand Forks Street Railway, Grand Forks, N. D. He was formerly treasurer.

Joseph M. Nolan has succeeded James H. Powell as assistant superintendent of transportation of the Scranton Railway, Scranton, Pa. Mr. Nolan has been an employee of the company for more than twenty years.

A. J. Goedjen, manager of the Menominee & Marinette Light & Traction Company in Menominee, Mich., and Marinette, Wis., has been named manager of the northern division of the Wisconsin Public Service Corporation under a rearrangement of divisions. Mr. Goedjen's supervision over the operation of the corporation's properties will be widened to include twelve more communities.

Obituary

William L. Schulz, formerly claim agent for the Washington, Baltimore & Annapolis Electric Railroad, with headquarters in Baltimore, Md., died on Jan. 10 at his home in West Annapolis. Mr. Schulz went with the company in 1908 and remained there until his health forced him to retire.

Alfred J. Becht, active in civic affairs of Cincinnati, Ohio, and identified with traction interests, died recently. On Nov. 14, 1910, Mr. Becht became secretary of the Cincinnati Street Railway, succeeding James A. Collins. He served in this capacity until Jan. 1, 1926, when he resigned to devote his time to his various personal interests. Prior to the sale about four months ago of the Toledo, Bowling Green & Southern Railroad Mr. Becht was its secretary. He also served the Cincinnati-Hamilton Traction Company in a similar capacity until it was taken over recently by the Cincinnati Street Railway.

W. C. White, superintendent of the western division of the Pacific Electric Railway, Los Angeles, Cal., for many years, died recently. He had been a resident of Los Angeles for more than 30 years.

William Wright, auditor for the Washington, Baltimore & Annapolis Electric Railway, with headquarters in Baltimore, Md., died suddenly on Jan. 5. He was found unconscious at the wheel of his automobile in his garage. His death was due to apoplexy. Mr. Wright was 65 years old.

William H. Hodgins, secretary of the Okonite Company, died recently at his home in Glen Ridge, N. J. Mr. Hodgins had been associated with the Okonite Company for more than 40 years and served for many years as a director in addition to his office as secretary. During his long connection with the Okonite Company he had seen the wire and cable industry develop from its earliest application to its present tremendous proportions.

George William Norwood, 83 years old, Kokomo, Ind., one of the promoters and builders of the interurban line of the Marion & Bluffton Traction Company, Bluffton, Ind., died recently in Lebanon.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

$5,000,000 for Steel Equipment

Long Island Railroad Outlay Includes 60 Motor and 30 Trail Cars for Electric Service

George Le Boutillier, vice-president of the Long Island Railroad, announced this week that by the end of 1927 every passenger-carrying car operated in both steam and electric train service on the Long Island Railroad system will be of steel construction. This means that the Long Island will be the first Class I railroad in the United States to retire all remaining wooden cars and place its passenger-carrying equipment on a 100 per cent steel basis.

Orders will be placed immediately for 127 new steel passenger cars. Of these 117 will be coaches and ten combination baggage and passenger cars. As wooden cars have not been operated in electric passenger train service for many years, the new steel cars to be ordered will be used on steam trains, although they are of such a type as may readily be converted into electric motor or trail cars. This new equipment represents an investment of $2,114,188. In addition to the cars covered by the new authorization, the company will put in service this year 114 new steel passenger cars which are now under construction at a cost of $2,902,286. The latter order includes 60 motor cars, 30 trail cars for electric service and 20 coaches and four combination cars for steam service. The outlay for new equipment to be placed in service during 1927 will therefore amount to more than $5,000,000.

Upon delivery of the 127 cars just authorized and the 114 now being built the Long Island will have a total of 1,411 steel passenger-carrying cars and no wooden cars.

Hyatt Names New Sales Manager and Chief Engineer

H. J. Forsythe, president of the Hyatt Roller Bearing Company, Newark, N. J., announces the appointments of H. O. K. Meister as general sales manager and A. W. Scarratt as chief engineer.

Mr. Meister joined the Hyatt forces more than fourteen years ago, locating first as an engineer at the home office in Newark. Later he was transferred to the Chicago office, where, after a few years, he took over the supervision of Hyatt sales work in the Western territory.

Eighteen months ago Mr. Meister was appointed assistant sales manager and remained in the headquarters at Newark, where he will continue to be located as general sales manager.

Mr. Scarratt is well qualified to take over the duties of chief engineer on account of his past experience in the design and construction of automotive, tractor, railroad and industrial equipment. He joined the Hyatt engineering staff a few months ago as assistant chief engineer. Mr. Scarratt will remain at the headquarters in Newark.

Both Mr. Meister and Mr. Scarratt are members of the Society of Automotive Engineers and have held important offices in the sections where they were previously located.

Supplementary Compensation for General Electric Employees

Supplementary compensation totaling $1,358,669.89 was distributed in February to 30,518 factory and office employees who have been in the employ of the General Electric Company for five years or more. The distribution was based on 5 per cent of the employee's earnings for the six months from July 1 to Dec. 31, 1926. Payments were made in General Electric Employees' Securities Corporation bonds or in cash, as the employees desired. The largest amount was paid to Schenectady employees, who received $452,489.

Large Terminal for Watertown

The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has two electric railway improvements under consideration for Watertown, Wis., provided authority to carry them out is received from the City Council. One plan calls for the removal of the company's tracks on Main Street to Western Avenue and Second Street and the other the building of a large terminal to which point all lines would run directly. These two proposals, which were circulated by the Council among business men of the city in the form of ballots on which to indicate their approval or disapproval, found 63 business men who favored removal of the tracks and 27 against it. To these ballots was attached another proposal, requesting that the company replace the railway service with buses.

Metal, Coal and Material Prices

Metals—New York	Feb. 8, 1927
Copper, electrolytic, cents per lb.	12.30
Copper wire, cents per lb.	14.50
Lead, cents per lb.	7.425
Zinc, cents per lb.	6.90
Tin, Straits, cents per lb.	69.50
Bituminous coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.95
Somerset mine run, Boston, net tons	2.30
Pittsburgh mine run, Pittsburgh, net tons	1.95
Franklin, Ill., screenings, Chicago, net tons	1.875
Central, Ill., screenings, Chicago, net tons	1.425
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$5.50
Weatherproof wire base, N.Y., cents per lb.	16.75
Cement, Chicago net prices, without bags	2.05
Linseed oil (5-bbl. lots), N. Y., cents per lb.	10.9
White lead in oil (100-lb. keg), N. Y., cents per lb.	14.50
Turpentine (bbl. lots), N. Y., per gal.	$0.78

New Equipment for Cincinnati, Hamilton & Dayton

In line with its extensive rehabilitation program the Cincinnati, Hamilton & Dayton Railway has placed an order for ten all-steel high-speed interurban cars with the J. G. Brill Company. Each car will seat 50 passengers—sixteen in a smoking compartment and 34 in the main section. Delivery is expected about May 1, at which time the present interurban equipment will be retired.

With a lower center of gravity, the car floor 1 ft. nearer the ground, and three easy steps in place of the four steep risers on the present interurban equipment, the new cars will provide every comfort from the passengers' standpoint.

Specifications call for an extensive finish in Duco, the color scheme a brilliant Tuscan red with black and gold lettering and striping to conform with company's standards for maximum visibility and elegance. The interior finish will be in rich mahogany, set off by rubber tile flooring and Pullman type dome lights. All cars are to have Hale & Kilburn deep cushion, double spring, curved back, leather seats, and will be equipped with water flush toilets and wash basins, and sanitary water coolers of the indirect icing type, all of the very latest models.

In order to minimize the possibility of accidents while operating in the city, a concealed group of lights over the front dash of the cars has been specified. The front end of each car will be lighted in this manner when the headlight is dimmed while running through city streets. In addition to a red tail light there will be a stop light which is to function when the brakes are set, thus giving motorists a caution signal that a stop is about to be made.

To insure the maximum comfort for trainmen, permanent sun visors over the motorman's window, automatic window cleaners, comfortable leather chairs, and special electric heaters have been specified.

Of the ten cars, seven will carry baggage compartments, the other three being designed for double-end operation. An automatic coupling device provides for connecting the air line and for making all necessary electrical contacts for motor control. Each car will be equipped with four 60-hp. Westinghouse ventilated motors.

Spanish Northern to Extend Electrification

The Spanish Northern Railway is about to electrify its lines, starting from Barcelona, through all of the section Barcelona-Manresa and the line Lerida-Varagoza, as well as the section running toward San Juan de las Abadesas in the Pyrenees. On all these lines direct current of 1,500-volt tension will be used.

Rolling Stock

Mississippi Valley Public Service Company has added two new one-man safety cars to its equipment. These cars embody the latest developments in street car design and have been placed in service in La Crosse, Wis.

Fageol Company, Kent, Ohio, reports delivery of two buses to the Scranton Railways and fifteen buses to the city of Detroit, Department of Street Railways, during the period from Dec. 15 to 31, inclusive.

United Railways of St. Louis, Mo., is equipping all of its 1,800 cars with automatic window wipers as a safety measure. The wipers will assure the motorman a clear vision in all kinds of weather. They work on the same principle as the more familiar automobile windshield wiper, but cover a much larger area of the glass. Fifty cars on the Park Avenue division and several on the various suburban lines have already been equipped with the cleaners.

Track and Line

Cincinnati, Hamilton & Dayton Railway, Dayton, Ohio, has commenced the reconstruction of its line between Dayton and Cincinnati, it was announced this week by J. H. McClure, vice-president and general manager. The work will cost approximately $200,000.

Athol & Orange Transportation Area, Orange, Mass., shows much activity in the way of improvement in the past year. The tracks and bridge between Athol and Brookside Park, about half way to Orange, have been reconstructed; 1,000 ft. of 60-ft. rail has been laid in South Main Street, Athol, and 4,000 new ties have been placed. In addition more than 2,000 ft. of overhead was installed with new span wires and poles. The largest expenditure was for power, which cost $12,908.

Trade Notes

Raymond H. Liefeld, formerly a salesman for the Packard Motor Car Company, has joined the forces of the Bridgeport Brass Company of Bridgeport, Conn.

Mather Garland has been appointed acting general manager of the Hegeman-Castle Corporation of Chicago, replacing W. E. Kelly, resigned. The Hegeman-Castle Corporation is owned and controlled by the National Railway Appliance Company of New York.

American Brown Boveri Electric Corporation, Camden, N. J., announces that Harold D. Gregory has just joined the patent department. Mr. Gregory is a graduate of the George Washington University law school and also a Stevens Institute graduate in engineering. For several years he was patent examiner of the Eastern Railroad Association at Washington, D. C., and for the past few years has been with Bottom, Hudnall, Lecher & McNamara of Milwaukee, Wis. With the former, he conducted infringement and validity investigations for the railroads, as assistant to General Counsel Robert J. Fischer. With the latter company Mr. Gregory was solicitor of patents in the patent department.

Edwin Besuden has joined the sales organization of the National Railway Appliance Company in the capacity of special representative, with headquarters at the main office of the company, 452 Lexington Avenue, New York City. Mr. Besuden was for many years sales manager of the Jewett Car Company, and later served as manager of the railway department Chicago Varnish Company in the Eastern district. Due to a typographical error in the JOURNAL of Jan. 29, Mr. Besuden's name was printed "Desuden."

Manganese Steel Forge Company, Philadelphia, Pa., has appointed Harry Howe engineer of railway equipment in connection with the development of the use of Rol-Man Steel in steam and electric railway passenger and freight equipment. Mr. Howe has resigned as special engineer for the Pressed Steel Car Company, after 21 years service with that concern. He is entirely familiar with all types of steam, electric and freight car details of equipment and design.

Rome Wire Company, Rome, N. Y., has opened a new warehouse for the purpose of serving its Detroit territory. The warehouse is located at 199 Minnie Street, Detroit. It is under Herman C. Joos, the district manager of the company at Detroit, who has always been in charge of this territory.

International Steel Tie Company announces the appointment of Frederic A. Tayler, Richmond, Va., as its southeastern representative, to handle all business in Virginia, North and South Carolina, Georgia, Florida and a part of Tennessee and Alabama. Mr. Tayler was born in Philadelphia on April 7, 1898. He was educated in the public schools there, but removed to Spokane, Wash., in 1912. There he continued his education, entering the Lewis and Clark High School. He left this school in 1915, his senior year, to accept a special apprenticeship with the Baldwin Locomotive Works at the Philadelphia plant. When he had completed this course Mr. Tayler was transferred to the Eddystone plant as track foreman of engines. Later he was promoted to assistant advertising manager in Philadelphia. On Sept. 12, 1921, he was transferred to the domestic sales department, going to the Richmond, Va., office as sales representative. He filled this position until Jan. 1, 1927, when he engaged in the railway supply business.

Ames Shovel & Tool Company, Boston, Mass., announces the appointment of N. E. Brooks as representative in the railway sales division of the Oliver Ames & Sons Corporation. Mr. Brooks is a graduate engineer of Massachusetts Institute of Technology, and comes to the Ames Shovel & Tool Company with fifteen years' experience in railway sales work. His headquarters will be at 41 Park Row, New York City.

New Advertising Literature

Ohmer Fare Register Company, Dayton, Ohio, has just issued a new circular describing its ticket printing register, type 79. The machine is designed for use on buses as well as street cars.

W. S. Godwin Company, Inc., Baltimore, Md., is distributing a new booklet describing steel paving guards. "Booklet 27" contains comprehensive photographs and cross sections showing the application of this product to road edging, street railway paving platforms and steps, sewer inlets and columns.

American Brown Boveri Electric Corporation, Camden, N. J., is mailing out a handsome booklet dealing with the merits of its steam turbo-generators. Splendid illustrations, charts and diagrams are features of the new mailing piece.

Hyatt Roller Bearing Company, Newark, N. J., has announced that the recently named headquarters for the central sales division are now located at 806 Fulton Building, that city. They were formerly at 1352 Union Trust Building. The new location provides amply for the increased sales and engineering forces of the central division, functioning under the direction of B. H. Lytle. H. R. London, a new member of the Pittsburgh force, is now operating in the industrial field of W. L. Iliff.

General Electric Company, Schenectady, N. Y., has just issued a new loose-leaf circular describing arc-welding, equipment. In the main, the circular details recent developments in helmets for operators of arc-welding apparatus.

Dunn Painting Machine Company, San Francisco, Cal., has issued a pamphlet describing the Dunn patent painting machine and the Dunn patent cleaning process. The Dunn equipment and process feature the complete breaking up and atomization of the paint in the machine itself and not at the nozzle. The paint is carried in suspension in the atomized form through a single line of hose for any reasonable distance. The Dunn company believes that this insures a more uniform application of paint than when the atomization is accomplished at the nozzle.

Ohio Brass Company, Mansfield, Ohio, is distributing a descriptive mailing piece which presents new O-B bonds, designated as Hebi-bede Titon and AW-12. The first bond is especially designed for use on heavily beaded and Weber type joints where it is impracticable to install the ordinary type of rail bond. It embodies all the features of the Titon bond, including steel terminals and copper sleeves. The AW-12 bond can be wedged firmly to the rail base by the tap of a hammer before welding is started.

Kentucky Rock Asphalt Company, Louisville, Ky., has just issued "The Story of Kyrock," a booklet describing its natural asphaltic paving material which is mined in Edmonson County, Kentucky. Halftone illustrations give a very clear idea of its application to paving projects of every description, including its use in connection with street railway construction.

Lightness of Weight—

Flexibility of Operation and—

"Peacock" Staffless Brakes—

Reg. U. S. Pat. Off.

features of new Williamsport, Pa., cars!

Emphasizing these vital elements of modern rolling stock five one-man, two-man cars were recently delivered to the Williamsport Passenger Railway of Williamsport, Pa., by the J. G. Brill Company.

The interior appearance of these cars is particularly pleasing, brown leather upholstery being standard equipment, while the motorman's operating equipment is enclosed by wood paneling.

Naturally, "Peacock" Staffless Brakes were specified in these cars on account of their light-weight, tremendous braking power, low installation and maintenance costs, simplicity of operation and their occupation of small platform space.

NATIONAL BRAKE CO., Inc.
890 Ellicott Square, BUFFALO, N. Y.

A Big Battery for a Big Job

Willard Thread-Rubber Insulation

When the wheels stop turning the bus stops earning. And when buses are piling up mileage month after month it pays real dividends to have a battery that stands the racket of rough roads and long-hour use.

F.A. Willard

The plates of the Willard Bus Battery are extra heavy. These, together with Willard Threaded Rubber Insulation, give uninterrupted service under the hardest job that has ever been put up to an automotive battery.

WILLARD STORAGE BATTERY COMPANY
CLEVELAND, OHIO

Willard Batteries

Baker-Raulang Model 10 39-passenger Suburban Type Body Mounted on 227" Wheelbase Chassis. Detail specifications in Bulletin 106, sent on request.

THE first closed body for an automotive vehicle was designed and built in the shops of this company. Now four hundred thousand square feet of manufacturing space and seventy-three years of coach building experience are devoted to creating and building bodies which will *"Promote Public Popularity."*

THE BAKER-RAULANG COMPANY

Bus Body Division Cleveland, Ohio

Baker
Raulang
Bus Bodies

The DUFF Pinion Puller, illustrated above, is the simplest, safest, quickest and most positive one-man tool ever developed for use in repair shops, power houses, Street Railway shops . . . any place, in fact, where motors, gears or pinions are used. Adapted also for removing pulleys and small fly wheels. Detailed literature on request.

ASSIGN your toughest job to a DUFF Jack. Spot a DUFF under that heavy load—"It's Light on DUFF Jacks." In every field—for every lifting requirement—there is a model that lives up to this slogan.

Sturdy, long-lived, easier to operate, scientifically designed and accurately manufactured, DUFF Jacks perform satisfactorily even under the most adverse conditions. Repairs are practically eliminated. You save in labor cost, in time and in trouble.

It *pays* to standardize on DUFF Jacks.

Write for detailed literature on jacks in which you are especially interested.

THE DUFF MANUFACTURING COMPANY, Pittsburgh, Pa.
Established 1883 Cable Address "Leverjack"

250 Park Avenue NEW YORK
Railway Exchange Bldg. ST. LOUIS
Peoples Gas Bldg. CHICAGO
Monadnock Bldg. SAN FRANCISCO
Candler Building ATLANTA
Southern Pacific Bldg. HOUSTON

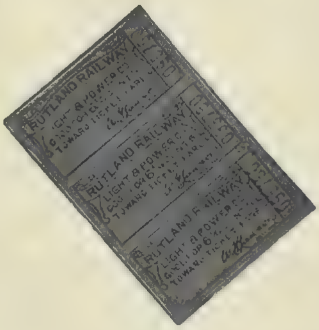
DUFF DUFF JACKS

International Harvester
6-Cylinder Motor Coaches

are the product of one dominant idea—to give the coach route operator a quality vehicle at low cost. The idea is not uncommon but *the coach is.* It is built on a long, low, fast and sturdy chassis. It has attractive lines. Its inviting interior holds perfect comfort for 15 passengers in the Club Coach and for 17 in the Sedan-type Coach. The tremendous value at the outset is more and more apparent as the coach reaches big-figure mileage. Build patronage and profit with International Harvester 6-Cylinder Coaches.

INTERNATIONAL HARVESTER COMPANY
606 So. Michigan Ave. of America *(Incorporated)* Chicago, Ill.

INTERNATIONAL AUTOMOTIVE SERVICE *is rendered through* 125 COMPANY-OWNED BRANCHES



Speeding up service

To speed up service—and yet maintain accuracy of collections—is a problem well solved by the use of

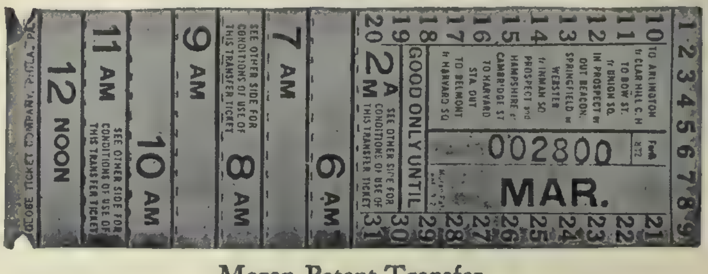
GLOBE

Tickets--Transfers--Passes

Designed by specialists for all standard and special requirements. Ask for further particulars and samples of our work.

GLOBE TICKET COMPANY
116 N. 12th Street, Philadelphia, Pa.
Los Angeles New York San Francisco

ALL WAYS GLOBE THAT'S THE TICKET



Moran Patent Transfer

Modern Plush Patterns!
are exceptionally attractive

Most railway men, when they think of Mohair Plush, think of red or green plush. Green is always an attractive serviceable color.

But there are many new and distinctively modern patterns and colorings now made as standard by Massachusetts Mohair Plush Co. They can be used most effectively in planning a passenger-attractive car interior. And they *all* have the well known Mohair Plush characteristics,—*easy to clean, always "new-looking," and usually good for the life of the car.*

Samples and quotations on request.

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Main Office
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Makers of BAY STATE PLUSH

New York Agent:
Sisson Supply Co.
1845 Grand Central Terminal,
New York City

Western Agent:
Midgley & Borrowdale
1822 McCormick Building,
Chicago, Illinois.

MASSACHUSETTS MOHAIR PLUSH
The railroad standard for over 35years

An increasingly large portion of the actual income derived from car card advertising service must be devoted to building and maintaining the prestige of car card advertising in the face of the active competition of all other media.

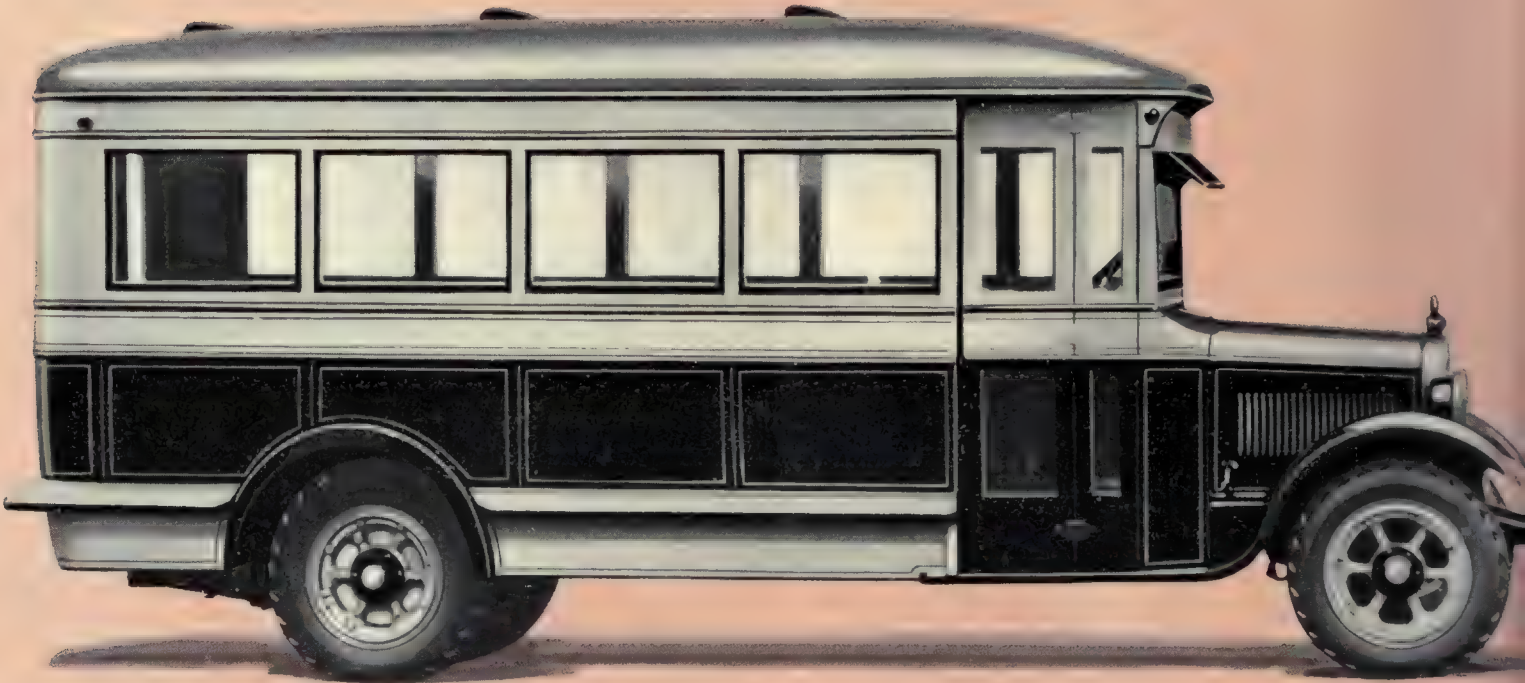
Creating and protecting our mutual interest is a costly item.

Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

They Ride - -
and Ride again

GRAHAM BROTHERS
GB
DETROIT

Ease and Comfort



The 21-Passenger street car type coach illustrated above is being shown marked preference by operators. Its interior matches its exterior in trim, clean-cut appearance. The well-cushioned, well-spaced seats are exceptionally comfortable.

GRAHAM BROTHERS
SOLD BY DODGE BROTHERS

Hold Patronage

Pleasant Riding Qualities of Graham Brothers Motor Coaches Build Business—and 21-Passenger Capacity Makes Operation Profitable

Graham Brothers Motor Coaches are so attractive in appearance they invite patronage—so comfortable and dependable they hold that patronage.

Daily operation is proving more conclusively that the coach of medium capacity best meets the demands of public and operators alike.

Graham Brothers 21-Passenger Street Car Type Motor Coaches assure the operators dependability, low cost, ease of handling and adaptability—and they stand up day after day in the gruelling service to which motor coaches are subjected. They appeal to passengers because of their fine appearance, frequent service, quiet, comfort and speed with safety.

For completeness and accessibility the service facilities for Graham Brothers Motor Coaches are not equalled by any other motor coach organization.

PRICES: 21-Passenger Street Car Type, Complete, $3815;
12-Passenger Parlor Coach, Complete, $3750, f. o. b. Detroit.

MOTOR COACHES

DEALERS EVERYWHERE

STABILITY

your investment is safe

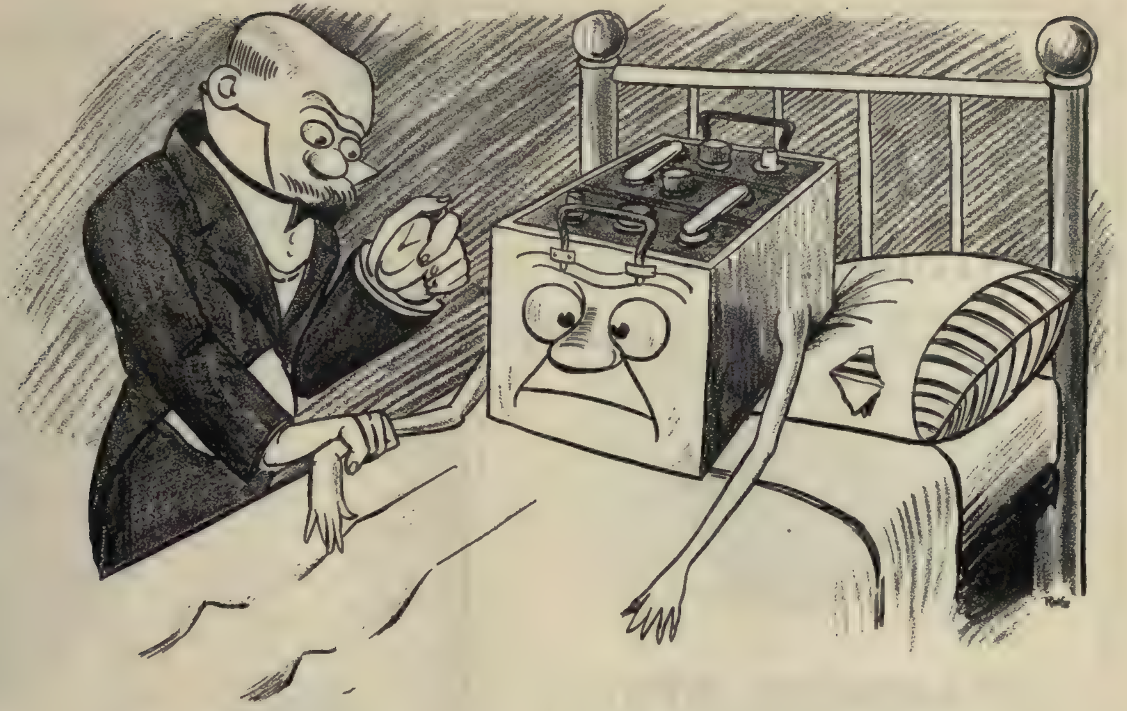
An operator's investment in Graham Brothers Motor Coaches is a sound investment.

It is secured by the recognized stability of Graham Brothers, a division of Dodge Brothers, Inc.

The employment of thousands of men and the earnings of millions of dollars are dependent upon the continued satisfactory performance of the products of this great organization.

Dodge Brothers Dealers everywhere recognize their responsibility in safeguarding the Good Will of a Good Name. They are equipped to give immediate service. They carry a complete stock of repair parts. And the Dodge Brothers Dealer is right there where you bought your Motor Coach, this year, next year, whenever you need him.

GRAHAM BROTHERS
EVANSVILLE · DETROIT · STOCKTON
A DIVISION OF DODGE BROTHERS, INC.
GRAHAM BROTHERS (CANADA) LIMITED, TORONTO, ONTARIO



'Hardening of the Arteries' from a fast life

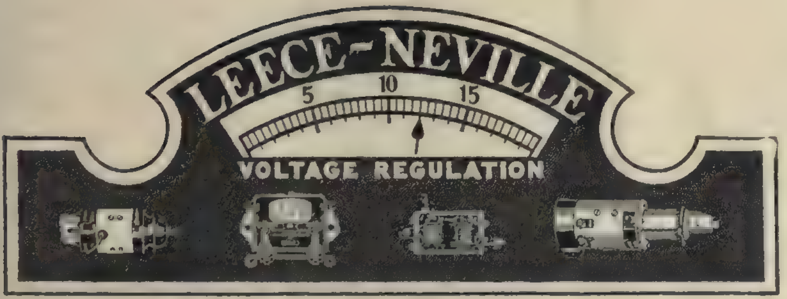
Every month that harsh verdict is pronounced over hundreds of batteries—young batteries that ought to be in the prime of life.

And then these batteries, that started out so full of promise, are ignominiously buried in the scrap heap—potter's field—and somebody's good money has to be spent to replace them.

The fast life they had to lead—constant overcharge or undercharge—killed them. No battery can last its full time if it leads such a life.

Leece-Neville Patented Voltage Regulation prevents the conditions which kill batteries. All over the country batteries thus protected are giving several times usual service life, because they don't have to lead so fast a life.

As a result, most bus makers either install Leece-Neville Patented Regulation, or provide for its optional installation—if you haven't got it let us tell you about it, and stop this flaming youth among your batteries.



THE LEECE-NEVILLE CO.

5353 Hamilton Ave., Cleveland, Ohio

Steel Axles
Steel Springs
Armature Shafts
Rolled Steel Wheels

ISI

STANDARD STEEL WORKS COMPANY
PHILADELPHIA, PA.
BRANCH OFFICES:
Chicago New York Portland San Francisco Pittsburgh
St. Louis Houston Richmond St. Paul Mexico City
WORKS: BURNHAM, PA.

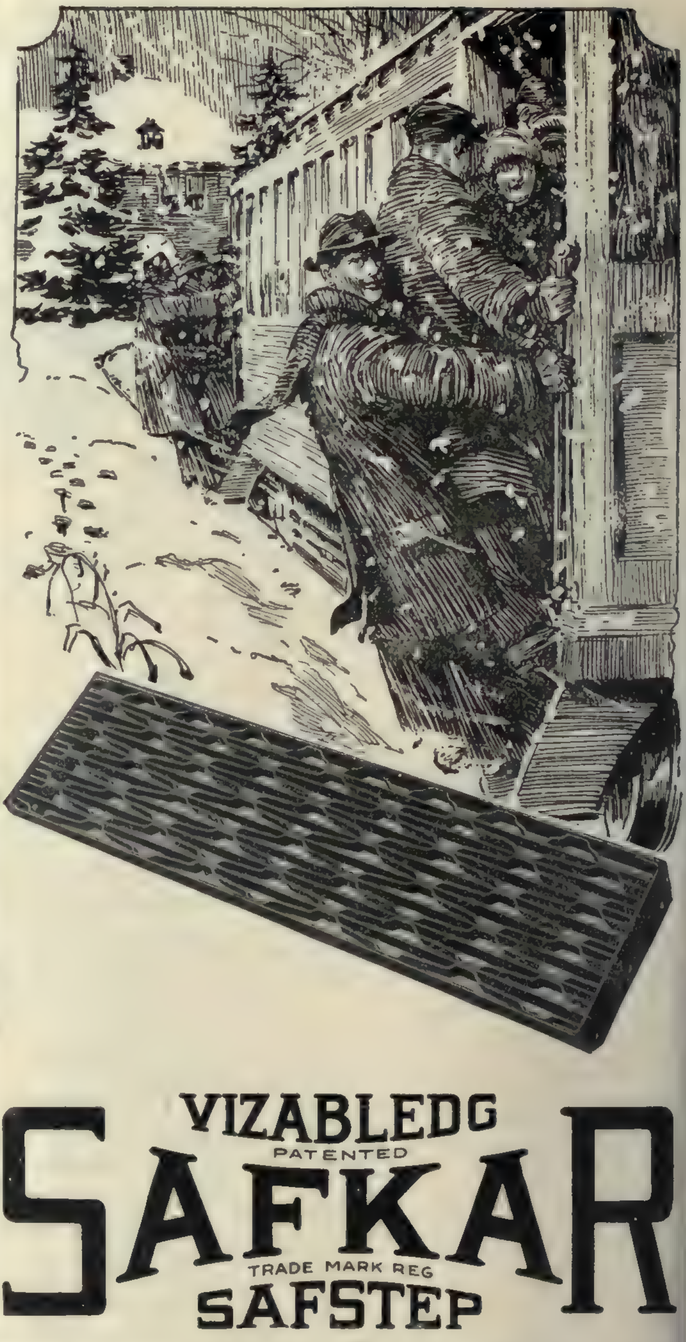
BUFFALO
Hand-Holds—

are a necessity! Without them great difficulty is experienced by passengers attempting to walk through cars. They create better public relations!

They will not stain the hands, and the riding public, which shuns anything soiled, is pleased with this feature. This also helps to improve good will!

And they are moderately priced. *Investigate.*

CENTRAL EQUIPMENT COMPANY
800 Englewood Ave., Buffalo, N. Y.



VIZABLEDG
PATENTED
SAFKAR
TRADE MARK REG
SAFSTEP

Winter's icy storms bring no added hazard to the car equipped with "**Safkar**" Steps. Snow, ice or sleet will not make their surface slippery —snow will not build up in and on them. Not only are step accidents reduced, but traffic is speeded up because passengers feel the secure "**Safkar**" foot hold.

Write for Bulletin D28.

IRVING IRON WORKS CO.
LONG ISLAND CITY, N.Y. U.S.A.
Established in 1902
SALES OFFICES IN ALL PRINCIPAL CITIES
See Your Telephone Book for Local Address

P-139

OONGLI

Watch a couple of Zulus and you'll find that their method of greeting is by shaking thumbs (oongli).

By this exercise of their daily duties they become quite deft with the thumb.

But in America the thumb has never shown up as much of a factor in the day's work.

Here and there you may see a carbon brush application made by rule of thumb, and it may get by, but as a whole, such applications show up awfully poor in comparison with a Morganite brush application made on engineering prescription.

In short, while the Zulu's thumbwork is deft—the American's is dumb.

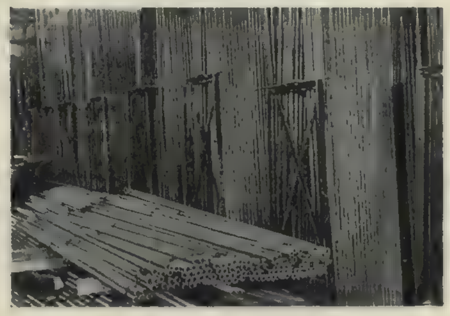
Morganite Brush Co., Inc.

Main Office and Factory
3302-3320 Anable Ave., Long Island City, N. Y.

DISTRICT ENGINEERS AND AGENTS

Pittsburgh, Electrical Engineering & Mfg. Co., 909 Penn Ave.
Cincinnati, Electrical Engineering & Mfg. Co., 607 Mercantile Library Building.
Cleveland, Electrical Engineering & Mfg. Co., 422 Union Building.
Baltimore, O. T. Hall, Sales Engineer, 437-A Equitable Building.
Revere, Mass., J. F. Drummey, 75 Pleasant Street.
Los Angeles, Special Service Sales Co., 502 Delta Building.
San Francisco, Special Service Sales Co., 222 Underwood Building, 545 Market Street.
Toronto, Can., Railway & Power Engineering Corp., Ltd., 101 Eastern Ave.
Montreal, Can., Railway & Power Engineering Corp., Ltd., 326 Craig St., West.
Winnipeg, Can., Railway & Power Engineering Corp., Ltd., P. O Box 325.

Do You Buy Repairs For Your Packard At the Five and Ten?



Trolley Pole Stock in Nuttall Store Room

Not on your life. You know that only Packard can turn out Packard cars and parts—you can't afford to take any chances.

But how about trolley parts and accessories? You should see some of the junk *we* see. Oh Man! soft, scrap brass trolley wheels, where the best of phosphor bronze is hardly good enough. Heavy, cast iron harps, where lightest malleable iron or forgings have their own troubles to stand the gaff.

Poles made of almost any kind of tubing, where heat treated steel, reinforced, carefully swedged and tapered is Nuttall Standard.

Springs!—well just springs, that's all. A spring is a spring, but the service requires the Nuttall Spring, designed to give the right tension, the right wheel contact pressure on the wire—oil tempered springs that *spring* and don't set.

Trolley parts—run of mines stuff—actually cost you more money than genuine, guaranteed Nuttall parts. No substitute is ever as good. Ask the man with a glass eye.

Send for a Nuttall Catalog and Price List

1927

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

Bankers and Engineers

Ford, Bacon & Davis
Incorporated
Engineers
115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

STONE & WEBSTER
Incorporated
EXAMINATIONS REPORTS APPRAISALS
ON
INDUSTRIAL AND PUBLIC SERVICE PROPERTIES
New York Boston Chicago

SANDERSON & PORTER
ENGINEERS
PUBLIC UTILITIES & INDUSTRIALS
Design Construction Management
Examinations Reports Valuations
CHICAGO NEW YORK SAN FRANCISCO

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER, MASSACHUSETTS
REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

C. B. BUCHANAN, President W. H. PRICE, JR., Sec'y-Treas. JOHN F. LAYNG, Vice-President
BUCHANAN & LAYNG CORPORATION
Engineering and Management, Construction
Financial Reports, Traffic Surveys
and Equipment Maintenance
BALTIMORE
1904 Citizens National Bank Bldg.
Phone: Hanover: 2142
NEW YORK
49 Wall Street

HEMPHILL & WELLS
CONSULTING ENGINEERS
Gardner F. Wells Albert W. Hemphill
APPRAISALS
INVESTIGATIONS COVERING
Reorganization Management Operation Construction
43 Cedar Street, New York City

WALTER JACKSON
Consultant on Fares and Motor Buses
The Weekly and Sunday Pass—Differential Fares—Ride Selling
143 Crary Ave., Mt. Vernon, N. Y.

KELLY, COOKE & COMPANY
ENGINEERS
Operation and Management
Traffic and Transportation Surveys
PARKWAY at SIXTEENTH ST. PHILADELPHIA

The J. G. White Engineering Corporation
Engineers—Constructors
Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.
43 Exchange Place New York

THE BEELER ORGANIZATION
ENGINEERS AND CONSULTANTS
Traction - Traffic - Equipment - Power Investigations
TRANSPORTATION, TRAFFIC, AND OPERATING SURVEYS
COORDINATING SERVICE—FINANCIAL REPORTS
APPRAISALS—MANAGEMENT
52 Vanderbilt Ave. New York

ENGELHARDT W. HOLST
Consulting Engineers
Appraisals Reports Rates Service Investigation
Studies on Financial and Physical Rehabilitation
Reorganization Operation Management
683 Atlantic Ave., BOSTON, MASS.

KELKER, DeLEUW & CO.
CONSULTING ENGINEERS
REPORTS ON
Operating Problems Valuations Traffic Surveys
111 W. Washington Street, Chicago, Ill.

DAY & ZIMMERMANN, INC.
ENGINEERS
DESIGN - CONSTRUCTION - REPORTS
VALUATIONS - MANAGEMENT
NEW YORK PHILADELPHIA CHICAGO

STEVENS & WOOD
INCORPORATED
ENGINEERS AND CONSTRUCTORS
120 BROADWAY, NEW YORK
ENGINEERING CONSTRUCTION YOUNGSTOWN, O. FINANCING MANAGEMENT

McCLELLAN & JUNKERSFELD
Incorporated
ENGINEERING AND CONSTRUCTION
Examinations—Reports—Valuations
Transportation Problems—Power Developments
68 Trinity Place, New York
Chicago St. Louis

J. ROWLAND BIBBINS
Engineer—2301 Connecticut Ave., N.W., Washington, D. C.
TRANSPORTATION SURVEYS
Organized Traffic Relief and Transit Development
Co-ordinating Motor Transport, Railroad and City Plans, Service, Routing, Valuation, Economic Studies
EXPERIENCE IN 20 CITIES

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of Water Tube Boilers of continuing reliability

BRANCH OFFICES

BOSTON, 49 Federal Street
PHILADELPHIA, Packard Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
PHOENIX, ARIZ., Heard Building
DALLAS, TEX., 2001 Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., 805 Gasco Building

THE BABCOCK & WILCOX COMPANY
STEAM

WORKS
Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

BRANCH OFFICES

DETROIT, Ford Building
NEW ORLEANS, 344 Camp Street
HOUSTON, TEXAS, 1011-13 Electric Building
DENVER, 444 Seventeenth Street
SALT LAKE CITY, 405-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building

Type R-11
Double Register

International Registers

Made in single and double types to meet requirements of service. For hand or foot, mechanical or electric operation. Counters, car fittings, conductors' punches.

The International Register Co.
15 South Throop Street, Chicago, Illinois

THE WORLD'S STANDARD

"IRVINGTON"

Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slot Insulation Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.
Irvington, N. J.
Sales Representatives in the Principal Cities

A. B. COLE
Commercial Consultant
Merchandising and Co-ordination of Transportation
500 Shelbourne Ave., Wilkinsburgh, Pa. (Pittsburgh)

Our advertisement in the issue of February 5 showed how

HASKELITE and PLYMETL

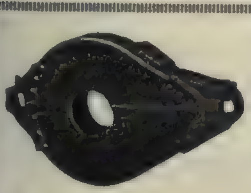
effect big savings in the weight of street cars. Haskelite has been specified on five new cars being built for Virginia Ry. & Power Co.
Another ad will appear next week.

HASKELITE MANUFACTURING CORPORATION
133 W. Washington St., Chicago, Ill.

THE P. EDWARD WISH SERVICE
50 Church St. NEW YORK
Street Railway Inspection DETECTIVES
131 State St. BOSTON

UNA
RAIL BONDS·RAIL JOINTS
DYNAMOTORS
WELDING ROD
UNA Welding & Bonding Co.
Cleveland, Ohio.

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.



CHILLINGWORTH
One-Piece Gear Cases
Seamless—Rivetless—Light Weight
Best for Service—Durability and Economy. *Write Us.*
Chillingworth Mfg. Co.
Jersey City, N. J.

INDUSTRIAL GASES

OXYGEN
ACETYLENE

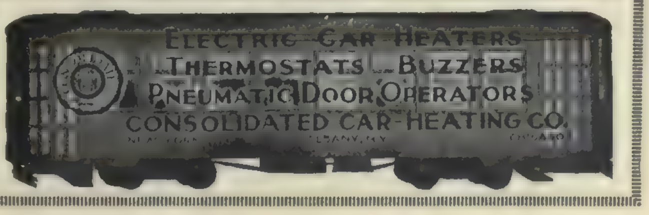
I.O.C. SYSTEM

HYDROGEN
NITROGEN

Quick shipment and low prices also on cylinders, valves, torches, regulators and supplies.

International Oxygen Co., Main Offices: Newark, N. J.
Branches: New York Pittsburgh Toledo

Transmission Line and Special Crossing Structures, Catenary Bridges
WRITE FOR OUR NEW DESCRIPTIVE CATALOG
ARCHBOLD-BRADY CO.
Engineers and Contractors SYRACUSE, N. Y.



"HOFFMANN"

"Hoffmann" Precision Roller Bearings combine the load-ability, the shock-ability, the speed-ability and the trouble-free simplicity which—in railway terms—mean maximum mileage with minimum maintenance. Your motors can be **"Hoffmann"** equipped—ask your motor builder, or our engineers.

NORMA-HOFFMANN BEARINGS CORPORATION
Stamford — Connecticut
PRECISION BALL, ROLLER AND THRUST BEARINGS

Greater Service Per Dollar Invested

"Tiger" Bronze Axle and Armature Bearings

More-Jones "Tiger" Bronze castings for axle and armature-bearing service was one of our early achievements. This is probably the most widely known bronze on the market. It has stood the test of time. There is nothing better for long, efficient and most economical results. Let us quote you.

More-Jones Brass & Metal Co.
St. Louis, Mo.

MORE-JONES QUALITY PRODUCTS

Griffin Wheel Company
410 North Michigan Ave.
Chicago, Ill.

Griffin Wheels
with
Chilled Rims
and
Chilled Back of Flanges
For Street and Interurban Railways

FOUNDRIES:

Chicago
Detroit
Denver
Boston
Kansas City
Council Bluffs
Salt Lake City
St. Paul
Los Angeles
Tacoma

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches..............$4.50 an inch
4 to 7 inches.............. 4.30 an inch
8 to 14 inches.............. 4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

SEARCHLIGHT SERVICE

Covers the advertising of

Agencies Wanted
Agents Wanted
Auction Notices
Bids Wanted
Books and Periodicals
Buildings for Sale
Business Opportunities
Civil Service Opportunities
Contracts to Be Let
Contracts Wanted
Desk Room for Rent
Desk Room Wanted
Educational
Employment Agencies
Evening Work Wanted
Foreign Business
For Exchange
For Rent
Franchises
Industrial Sites
Labor Bureaus
Machine Shops
Machinery Wanted
New Industries Wanted
Partners Wanted
Patent Attorneys
Patents for Sale
Plants for Sale
Positions Vacant
Positions Wanted
Property for Sale
Proposals
Receivers' Sales
Representatives Wanted
Salesmen Want Connections
Salesmen Wanted
Second Hand Equipment
  For Sale For Rent
  Exchange Wanted
Specialties
Tutoring
Vacation Work Wanted
Water Front Property
Work Wanted
Miscellaneous for Sale
  for Rent or Want Ads.

Can we serve you?

0150

POSITIONS VACANT

EQUIPMENT engineer and maintenance executive, six years' factory engineering experience and seven years' maintenance work with large railway company, desires change. College graduate with A-1 references. P-967, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

TRACK foreman, experienced in track and paving work. Energetic man wanted. Give references and experience in detail. P-968, Electric Railway Journal, Tenth Ave. at 36th St., New York.

POSITIONS WANTED

OPERATING man; capable of taking charge of transportation department of electric railway. Practical experience in each of its branches. Highest references. PW-944, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

SUPERINTENDENT of rolling stock, 24 years' experience, open for position. PW-960, Electric Railway Journal, Tenth Ave. at 36th St., New York.

TRACK engineer with twenty years' electric railway experience desires change in location. Thoroughly understands modern track and special work design, practice and necessity for economy. PW-969, Electric Railway Journal, 1600 Arch St., Phila., Pa.

TO HELP YOU

GET WHATEVER YOU WANT

"Searchlight" Advertising

G-8

FOR SALE

BIRNEY CARS

In First-Class Condition

WH-508 and GE-264 Equipment

Inspection Invited

Apply to

Eastern Mass. St. Ry. Co.

1 Beacon Street, Boston, Mass.

SPECIAL BARGAIN

20—306 C. V. MOTORS, ventilated, split frame, complete less gears.

IRVING S. VAN LOAN CORPORATION
1750 Broadway, New York City

Specialists in street cars or any part of a street car. Illustrated bulletin supplied on request.

FOR SALE

15 BIRNEY SAFETY CARS

Brill Built

West. 508 or G. E. 264 Motors
Cars Complete—Low Price—Fine Condition

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

12 miles 70-lb. ASCE Relayers.
10 miles 60-lb. ASCE Relayers.

practically as good as new. Also 12 miles 4/0 figure 8 Copper Wire practically new.

M. K. FRANK
Park Row Bldg. Union Trust Bldg.
New York City Pittsburg, Penna.

"Opportunity" Advertising: Think *"Searchlight"* First!

TULC A LUBRICANT

We make a specialty of

ELECTRIC RAILWAY LUBRICATION

We solicit a test of TULC on your equipment

The Universal Lubricating Co.
Cleveland, Ohio
Chicago Representatives: Jameson-Ross Company, Straus Bldg

FARE BOXES for BUSES

Let us tell you of this especially designed box for this class of service.

The Cleveland Fare Box Co.
4900 Lexington Ave., Cleveland, O.
Canadian Cleveland Fare Box Co., Ltd.
Preston, Ontario

COIN COUNTING And orting Machines CHANGES CARRIERS Tokens

Cold Dinners
for *your* passengers?

Not if you use
AJAX
BABBITT *for* ARMATURES
keeps the rolling stock rolling

The Ajax Metal Company
Established 1880
PHILADELPHIA
NEW YORK CHICAGO BOSTON CLEVELAND

PANTASOTE
Trade Mark
Seat and Curtain Materials
There is no substitute for Pantasote

AGASOTE
Trade Mark
Roofing—Headlining—Wainscoting
The only homogeneous panel board

*standard
for electric railway cars
and motor buses*

The PANTASOTE COMPANY Inc.
At 46th Street
250 Park Avenue
NEW YORK
Pantasote Products for Both ELECTRIC RAILWAYS AND BUSES

People's Gas Bldg., Chicago, Ill.

Where performance counts
use
Le Carbone Carbon Brushes
They talk for themselves

W. J. Jeandron
Factory Terminal Bldg.,
Fifteenth Street, Hoboken, N. J.
Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street
Canadian Distributors: Lyman Tube & Supply Co., Ltd.
Montreal and Toronto

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.

THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

The DIFFERENTIAL CAR

*Standard on
60 Railways for*

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential Bottom Dump Ballast Car
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

The Sterling Mark on Bus Bodies

The Lang Body Company
CLEVELAND, OHIO

LANG BODIES

The Sterling Mark on Bus Bodies

Sterling quality is always associated with Lang Bodies. It is inherent in the materials—the seasoned skeleton of the frame, the metal covering, the plate glass, the leather for the seats. It is built in the construction—the careful fitting of joints, the reinforcing, the manufacture and assembly of all parts. It is evident in the painting—the quality of the hardware, the study given to the perfection of every detail.

The Sterling Mark on bus bodies is found on Lang—put there by the work of long-experienced craftsmen in body building.

THE LANG BODY COMPANY, CLEVELAND, OHIO

"After all—
it's the Setting
that counts!"

COLUMBIA

Railway Supplies and Equipment

Machine and
Sheet Metal Work

Forgings
Special Machinery
and Patterns

Grey Iron and
Brass Castings

Armature and
Field Coils.

The
Columbia Machine Works
and M. I. Co.
265 Chestnut St., corner Atlantic Ave.,
Brooklyn, N. Y.

Structural Shapes · Steel Sheet Piling
Plates · Skelp
Bars and Bar Mill Products
Bands · Hoops
Axles · Wrought Steel Wheels
Rails · Rail Joints
Steel Cross Ties

CARNEGIE STEEL COMPANY
General Offices · Carnegie Building · 434 Fifth Avenue
PITTSBURGH PENNSYLVANIA

[illegible]

Wharton
Special Trackwork

Trackwork of superior quality,
incorporating the famous
Tisco Manganese Steel.

WM. WHARTON JR. & CO., Inc.
EASTON, PA.
OFFICES:
Boston Chicago El Paso Montreal New York
Philadelphia Pittsburgh San Francisco Scranton

B. A. HEGEMAN, Jr., President H. A. HEGEMAN, First Vice-Pres. and Treas.
F. T. SARGENT, Secretary W. C. PETERS, Vice-Pres. Sales and Engineering

National Railway Appliance Co.
Grand Central Terminal, 452 Lexington Ave., Cor. 45th St., New York
BRANCH OFFICES
Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago, Ill.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions
Anglo-American Varnish Co., Varnishes, Enamels, etc.
National Hand Holds
Genesco Paint Oils
Dunham Hopper Door Device
Garland Ventilators
Walter Tractor Snow Plows
Feasible Drop Brake Staffs
Ft. Pitt Spring & Mfg. Co., Springs
Flaxlinum Insulation
Anderson Slack Adjusters
Economy Electric Devices Co., Power Saving and Inspection Meters
"Topeseald" Lamps
Bus Lighting Equipment
Cowdrey Automotive Brake Testing Machine

Lorain Special Trackwork
Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY
Johnstown, Pa.
Sales Offices:
Atlanta Chicago Cleveland New York
Philadelphia Pittsburgh Dallas
Pacific Coast Representative:
United States Steel Products Company
Los Angeles Portland San Francisco Seattle
Export Representative:
United States Steel Products Company, New York, N. Y.

BUDA
ESTABLISHED
1881

Special Track Work of every
description

THE BUDA COMPANY
Harvey (Suburb Chicago) Illinois

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.
Air Brakes
Westinghouse Air Brake Co.
Air Receivers & Aftercoolers
Ingersoll-Rand Co.
Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M Co.
Armature Shop Tools
Columbia Machine Works
Elec. Service Supplies Co.
Automatic Regulators, Voltage, Current & Synchronizing
American Brown Boveri Corp.
Automatic Return Switch Stands
Ramapo Ajax Corp.
Automatic Safety Switch Stands
Ramapo Ajax Corp.
Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Cincinnati Car Co.
Illinois Steel Co.
National Ry., Appliance Co.
Standard Steel Works
Westinghouse E. & M. Co.
Axles, Steel
Carnegie Steel Co.
Babbitt Metal
Ajax Metal Co.
More-Jones Brass & Metal Co.
Babbitting Devices
Columbia Machine Works & M. I. Co.
Badges and Buttons
Elec. Service Supplies Co.
International Register Co.
Batteries, Storage
Willard Storage Battery Co.
Bearings, Ball
Norma-Hoffman Co.
Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
General Electric Co.
More-Jones Brass & Metal Co.
Westinghouse E. & M. Co.
Bearings, Center and Roller Side
Cincinnati Car Co.
Columbia Machine Works
Stucki Co., A.
Bearings, Roller
Norma-Hoffman Co.
Timken Roller Bearing Co.
Bells and Buzzers
Consolidated Car Heating Co.
Bells and Gongs
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Benders, Rail
Railway Trackwork Co.
Bodies, Bus
Baker-Raulang Co., The
Brill Co., The J G
Lang Body Co., The
Bodies, Passenger Car
Baker-Raulang Co., The
Body Material, Haskelite and Plymetl
Haskelite Mfg. Corp.
Boilers
Babcock & Wilcox Co.
Bolts & Nuts, Track
Illinois Steel Co.
Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.
Bonding Apparatus
American Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co
Bonds, Rail
American Steel & Wire Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.
Braces, Timber
Duff Mfg. Co.
Braces, Trench
Duff Mfg. Co.
Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.
Brake Adjusters
Brill Co., The J. G
Cincinnati Car Co.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.
Brake Shoes
American Brake Shoe & Foundry Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
Westinghouse Tr. Br. Co.
Brakes, Magnetic Rail
Cincinnati Car Co.
Brushes, Carbon
General Electric Co.
Jeandron, W. J.
LeCarbone Co.
Morganite Brush Co.
Westinghouse E. & M. Co.
Brushes, Graphite
Morganite Brush Co.
Brushes, Wire, Pneumatic
Ingersoll-Rand Co.
Brushholders
Columbia Machine Works
Bulkheads
Haskelite Mfg. Corp.
Bus Wheels, Steel
Heywood-Wakefield Co.
Buses
Brill Co., The J. G.
Graham Bros.
International Harvester Co.
International Motor Co.
Mack Truck Co., Inc.
Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
Cables (See Wires and Cables)
Cambric Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.
Carbon Brushes (See Brushes, Carbon)
Car Lighting Fixtures
Elec. Service Supplies Co.
Car Panel Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.
Car Steps, Safety
Cincinnati Car Co.
Irving Iron Works Co.
Car Wheels, Rolled Steel
Bethlehem Steel Co.
Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co.
Cars, Gas-Electric
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.
Cars, Gas, Rail
Brill Co., The J. G.
St. Louis Car Co.
Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
Wason Mfg. Co
Cars, Second Hand
Electric Equipment Co.
Cars, Self-Propelled
Brill Co., The J. G.
General Electric Co.
Castings, Brass Composition or Copper
Ajax Metal Co.
A. & J. M. Anderson Mfg. Co.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
More-Jones Brass & Metal Co.
Castings, Gray Iron and Steel
American Steel Foundries
Bemis Car Track Co.
Columbia Machine Works & M. I. Co.
Standard Steel Works
Castings, Malleable & Brass
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
Catchers and Retrievers, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.
Catenary Construction
Archbold-Brady Co.
Ceiling Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.
Ceilings, Plywood, Panels
Haskelite Mfg. Corp.
Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.
Change Trays
Cincinnati Car Co.
Circuit-Breakers
A. & J. M. Anderson Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.
Circuit Breakers, Oil
American Brown Boveri Corp.
Clamps and Connectors for Wires and Cables
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Westinghouse E. & M. Co.
Ohio Brass Co.
Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
Clusters and Sockets
General Electric Co
Coil Banding and Winding Machines
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.
Coils, Armature and Field
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.
Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Coin Counting Machines
Cleveland Fare Box Co.
International Register Co.
Coin Sorting Machines
Cleveland Fare Box Co.
Coin Wrappers
Cleveland Fare Box Co.
Commutator Slotters
Columbia Machine Works
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.
Commutator Truing Devices
General Electric Co.
Commutators or Parts
Cameron Electrical Mfg Co.
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.
Compressors, Air
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Tr. Br Co.
Compressors, Air, Portable
Ingersoll-Rand Co.
Condensers
General Electric Co.
Ingersoll-Rand Co.
Westinghouse E. & M. Co.
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Irvington Varnish & Ins. Co.
Connectors, Solderless
Westinghouse E. & M. Co.
Connectors, Trailer Car
Columbia Machine Works
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.
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Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.
Controller Regulators
Elec. Service Supplies Co.
Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.
Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.
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American Steel & Wire Co.
Anaconda Copper Mining Co.
Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co.
Anaconda Copper Mining Co.
Cord, Bell, Trolley, Register
American Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
Samson Cordage Works
Silver Lake Co.
Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.
Couplers, Car
American Steel Foundries
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.
Cranes, Electric, Industrial Truck, Mounted
Baker-Raulaug Co., The
Cranes, Hoists & Lifts
Electric Service Supplies Co.
Cross Arms (See Brackets)
Crossing Foundations
International Steel Tie Co.
Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
Crossings, Frogs & Switches
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
Crossings, Track (See Track Special Work)
Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.
Curtains & Curtain Fixtures
Brill Co., The J. G.
Pantasote Co., Inc.
Dealer's Machinery & Second Hand Equipment
Electric Equipment Co.
Frank, M. K.
Van Loan Corp., Irving S.
Derailing Devices (See also Track Work)
Derailing Switches
Ramapo Ajax Corp.
Destination Signs
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Detective Service
Wish-Service, P. Edward
Door Operating Devices
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
National Pneumatic Co.
Safety Car Devices Co.
Doors & Door Fixtures
Brill Co., The J. G.
Cincinnati Car Co.
General Electric Co.
Hale-Kilburn Co.
Doors, Folding Vestibule
National Pneumatic Co.
Safety Car Devices Co.
Drills, Track
American Steel & Wire Co.
Electric Service Supplies Co.
Ingersoll-Rand Co.
Ohio Brass Co.
Dryers, Sand
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Ears
Columbia Machine Works
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Electric Grinders
Railway Trackwork Co.
Electrical Wires and Cables
Amer. Electrical Works.
American Steel & Wire Co.
John A. Roebling's Sons Co.
Electrodes, Carbon
Railway Trackwork Co.
Una Welding & Bonding Co.
Electrodes, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.
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Archbold-Brady Co.
Beeler, John A.
Bibbins, J. Rowland
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Cole, A. B.
Day & Zimmermann, Inc.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
Kelly-Cooke Co.
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster
White Eng. Corp., The J. G.
Engines, Gas, Oil or Steam
Ingersoll-Rand Co.
Westinghouse E. & M. Co.
Exterior Side Panels
Haskelite Mfg. Corp.
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Cleveland Fare Box Co.
Nat'l Ry. Appliance Co.
Perey Mfg. Co.
Fare Registers
Electric Service Supplies Co.
Ohmer Fare Register Co.
Fences, Woven Wire & Fence Posts
American Steel & Wire Co.
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Cincinnati Car Co.
Consolidated Car Fender Co.
Star Brass Works
Wood Co., Chas. N.
Fibre and Fibre Tubing
Westinghouse E. & M. Co.
Field Coils (See Coils)
Flaxlinum Insulators
National Railway Appliance Co.
Floodlights
Electric Service Supplies Co.
Floor, Sub
Haskelite Mfg. Corp.
Flooring, Fireproof
Irving Iron Works Co.
Flooring, Non-Slipping
Irving Iron Works Co.
Flooring, Steel Subway
Irving Iron Works Co.
Flooring, Ventilating
Irving Iron Works Co.
Floors
Haskelite Mfg. Corp.
Forgings
Brill Co., The J. G.
Cincinnati Car Co.
Duff Mfg. Co.
Standard Steel Works
Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
Frogs, Track (See Track Work)
Frogs, Trolley
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Furnaces, Electric
American Brown Boveri Corp.
Fuses and Fuse Boxes
Columbia Machine Works & M. I. Co.
Consolidated Car Heating Co.
General Electric Co.
Westinghouse E. & M. Co.
Fuses, Refillable
General Electric Co.
Gaskets
Westinghouse Tr. Br. Co.
Gas Producers
Westinghouse E. & M. Co.
Gates, Car
Brill Co., The J. G.
Cincinnati Car Co.
Gauges, Oil and Water
Ohio Brass Co.
Gear Blanks
Brill Co., The J. G.
Standard Steel Works
Gear Cases
Chillingworth Mfg. Co.
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Westinghouse E. & M. Co.
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Columbia Machine Works & M. I. Co.
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General Electric Co.
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R. D. Nuttall Co.
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General Electric Co.
Generators
American Brown-Boveri Corp.
General Electric Co.
Leece Neville Co.
Westinghouse E. & M. Co.
Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.
Gongs (See Bells and Gongs)
Grating, Steel, Subway
Irving Iron Works Co.
Greases (See Lubricants)
Grinders & Grinding Supplies
Railway Trackwork Co.

(Continued on page 48)

4 Pneumatic Tie Tampers at Work on a Crossover

Reducing the Labor Item

A gang of four men employing Pneumatic Tie Tampers will accomplish as much per day as three times their number tamping by hand. With the untiring power of compressed air, a firm and solid bedding is secured which hand-tamping cannot equal.

Equipped with Ingersoll-Rand Paving Breakers, about one-third the number of men are needed as compared with hand methods. For cutting concrete, brick, or asphalt paving, and for breaking out old concrete track foundations, progress is faster and costs are cut in half.

Modern efficiency demands modern tools. Ingersoll-Rand Tie Tamping Outfits are used by over seventy of the leading electric railway companies as well as on the largest steam roads of the country.

Breaking out heavy concrete base with "I-R" CC Paving Breaker

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Railway Trackwork Co.

Grinding Bricks and Wheels
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Ramapo Ajax Corp.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

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Ohio Brass Co.

Hammers, Pneumatic
Ingersoll-Rand Co.

Hand, Holds
Central Equipment Co.

Harps, Trolley
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Elec. Service Supplies Co.
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R. D. Nuttall Co.
Star Brass Works

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General Electric Co.
Ohio Brass Co.

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Consolidated Car Heating Co.
Gold Car Heat. & Ltg. Co.
Nat'l Ry. Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car Stove
Smith Heater Co., Peter

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Railway Trackwork Co.
Una Welding & Bonding Co.

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Columbia Machine Works & M. I. Co.

Hoists, Portable
Ingersoll-Rand Co.

Hose, Bridges
Ohio Brass Co.

Hose, Pneumatic
Westinghouse Traction Brake Co.

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Leece Neville Co.

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International Harvester Co.

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Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
Westinghouse E. & M. Co.

Insulating Silk
Irvington Varnish & Ins. Co.

Insulating Varnishes
Irvington Varnish & Ins. Co.

Insulation (See also Paints)
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
Westinghouse E. & M. Co.

Insulation Slots
Irvington Varnish & Ins. Co.

Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.

Insulators (See also Line Materials)
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Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Interior Side Linings
Haskelite Mfg. Corp.

Interurban Cars (See Cars)

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Columbia Machine Works & M. I. Co.
Duff Mfg. Co.
Elec. Service Supplies Co.
National Ry. Appliance Co.

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Duff Mfg. Co.

Jacks, Ball Bearing, Screw
Duff Mfg. Co.

Jacks, Governor Controlled
Duff Mfg. Co.

Jacks, Horizontal
Duff Mfg. Co.

Jacks, Lifting
Duff Mfg. Co.

Jacks, Pipe Forcing
Duff Mfg. Co.

Jacks, Pole
Duff Mfg. Co.

Jacks, Push & Pull
Duff Mfg. Co.

Jacks, Special Purpose
Duff Mfg. Co.

Jacks, Track
Duff Mfg. Co.

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Brill Co., The J. G.
Cincinnati Car Co.

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General Electric Co.
Westinghouse E. & M. Co.

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Westinghouse E. & M. Co.

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Elec. Service Supplies Co.
Ohio Brass Co.

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Cincinnati Car Co.
Haskelite Mfg. Corp.

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Electric Service Supplies Co.

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Leece Neville Co.

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Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
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Line Material (See also Brackets, Insulators, Wires, etc.)
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Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
More-Jones Brass & Metal Corp.
Westinghouse E. & M. Co.

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American Brown Boveri Co.

Locomotives, Electric
American Brown Boveri Corp.
Cincinnati Car Co.
General Electric Co.
Westinghouse E. & M. Co.

Locomotives, Oil Engine, Electric Driven
Ingersoll-Rand Co.

Lubricating Engineers
Universal Lubricating Co.

Lubricants, Oil and Grease
Universal Lubricating Co.

Manganese Parts
Bemis Car Truck Co.

Manganese Steel Guard Rails
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co.

Manganese Steel, Special Track Work
Bethlehem Steel Co.
Wm. Wharton, Jr. & Co.

Manganese Steel Switches, Frogs and Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Meters (See Instruments)

Mirrors, Inside & Outside
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American Brown Boveri Corp.
General Electric Co.

Motor Buses (See Buses)

Motors, Electric
General Electric Co.
Westinghouse E. & M. Co.

Motorman's Seats
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
Wood Co., Chas. N.

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Bemis Car Truck Co.
Cincinnati Car Co.
Hubbard & Co.

Oils (See Lubricants)

Omnibuses (See Buses)

Oxygen
International Oxygen Co.

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Westinghouse Traction Brake Co.

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Elec. Service Supplies Co.
Irvington Varnish & Ins. Co.

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National Ry. Appliance Co.

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Haskelite Mfg. Corp.

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Ingersoll-Rand Co.

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Elec. Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Duff Mfg. Co.
Elec. Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
Ohio Brass Co.
Westinghouse Traction Brake Co.

Pipe Fittings
Standard Steel Works
Westinghouse Tr. Brake Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Elec. Service Supplies Co.
Nat'l Ry. Appliance Co.

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Haskelite Mfg. Corp.

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Ingersoll-Rand Co.

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Bethlehem Steel Co.
Elec. Service Supplies Co.
Ohio Brass Co.

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Hubbard & Co.

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Hubbard & Co.

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Bell Lumber Co.
International Creosoting & Construction Co.

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International Creosoting & Construction Co.
Naugle Pole & Tie Co.

Poles, Trolley
Elec. Service Supplies Co.
R. D. Nuttall Co.

Poles, Tubular Steel
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.

Portable Grinders
Buda Co., The

Potheads
Okonite Co.
Okonite-Callender Cable Co., Inc.

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National Ry. Appliance Co.

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Cincinnati Car Co.

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General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.

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Ingersoll-Rand Co. (A. S. Cameron Steam Pump Works)

Pumps, Vacuum
A. S. Cameron Steam Pump Works (Ingersoll-Rand Co.)
Ingersoll-Rand Co. (A. S. Cameron Steam Pump Works)

Punches, Ticket
International Register Co.
Wood Co., Chas. N.

Rail Braces and Fastenings
Ramapo Ajax Corp.

Rail Grinders (See Grinders)

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Carnegie Steel Co.
Illinois Steel Co.

Rail Joints, Welded
Lorain Steel Co.

Rail Welding
Metal & Thermit Corp.
Railway Trackwork Co.
Una Welding & Bonding Co.

Rails, Steel
Carnegie Steel Co.
Illinois Steel Co.

Railway Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.

Rattan
Brill Co., The J. G.
Elec. Service Supplies Co.
Hale-Kilburn Co.

Rectifiers, Mercury, Arc Power
American Brown-Boveri Corp.

Registers and Fittings
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
International Register Co.

Reinforcement, Concrete
American Steel & Wire Co.
Bethlehem Steel Co.
Carnegie Steel Co.

Repair Shop Appliances (See also Coil Banding and Winding Machines)
Elec. Service Supplies Co.

Repair Work (See also Coils)
General Electric Co.
Westinghouse E. & M. Co.

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Cincinnati Car Co.
Elec. Service Supplies Co.

Resistances
Consolidated Car Heating Co.

Resistance, Wire and Tube
General Electric Co.
Westinghouse E. & M. Co.

Retrievers, Trolley (See Catchers and Retrievers Trolley)

Rheostats
General Electric Co.
Westinghouse E. & M. Co.

Roofing, Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Roofs, Car and Bus
Haskelite Mfg. Corp.

Safety Control Devices
Safety Car Devices Co.

Sanders, Track
Brill Co., The J. G.
Elec. Service Supplies Co.
Ohio Brass Co.

Sash Fixtures, Car
Brill Co., The J. G.
Cincinnati Car Co.

Sash, Metal Car Window
Hale-Kilburn Co.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
Elec. Service Supplies Co.

Seating Materials
Brill Co., The J. G.
Haskelite Mfg. Corp.
Massachusetts Mohair Plush Co.
Pantasote Co., Inc.

Seats, Bus
Brill Co., The J. G.
Hale-Kilburn Co.

Seats, Car (See also Rattan)
Brill Co., The J. G.
Cincinnati Car Co.
Hale-Kilburn Co.

Second Hand Equipment
Electric Equipment Co.
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Van Loan Corp., Irving S.

Shades, Vestibule
Brill Co., The J. G.
Cincinnati Car Co.

Shovels
Brill Co., The J. G.
Hubbard & Co.

Shovels, Power
Brill Co., The J. G.

Side Bearings (See Bearings Center and Side)

Signals, Car Starting
Consolidated Car Heating Co.
Elec. Service Supplies Co.
National Pneumatic Co.

Signal Systems, Block
Elec. Service Supplies Co.
Nachod and United States Electric Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod and United States. Electric Signal Co.
Wood Co., Chas. N.

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Columbia Machine Works & M. I. Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
More-Jones Brass & Metal Co.
R. D. Nuttall Co.

Smokestacks, Car
Nichols-Lintern Co.

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Brill Co., The J. G.
Columbia Machine Works & M. I. Co.
Consolidated Car Fender Co.

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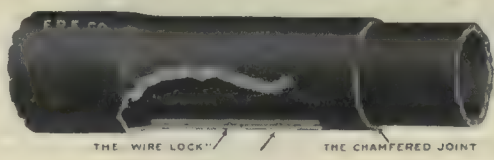

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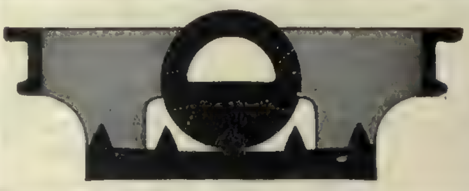

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ALPHABETICAL INDEX TO ADVERTISEMENTS

Page

A

Ajax Metal Co., The.......... 42
American Brass Co., The...... 50
American Brown Boveri Corp..16-17
American Car Co............52-53
American Electrical Works.... 49
American Steel Foundries 4
American Steel & Wire Co..... 49
Anaconda Copper Mining Co.... 50
Anderson Mfg. Co., A. & J. M.. 49
Archbold-Brady Co............ 39

B

Babcock & Wilcox Co......... 39
Baker-Raulang Co., The....... 25
Beeler Organization 38
Bemis Car Truck Co.......... 49
Bethlehem Steel Co........... 8
Bibbins, J. Rowland 38
Brill Co., The J. G..........52-53
Buchanan & Layng Corp...... 38
Buda Co., The............... 45

C

Cameron Electrical Mfg.Co..... 50
Carnegie Steel Co............. 45
Central Equipment Co......... 36
Chillingworth Mfg. Co......... 39
Cincinnati Car Co...........20-21
Cleveland Fare Box Co........ 41
Cole, A. B.................... 39
Collier, Inc., Barron G......... 30
Columbia Machine Works, The.. 45
Consolidated Car Fender Co.... 50
Consolidated Car Heating Co.... 39

D

Day & Zimmermann, Inc....... 38
Differential Steel Car Co., The.. 42
Duff Manufacturing Co., The... 26

E

Electric Equipment Co........ 41
Electric Ry. Equipment Co..... 49
Electric Service Supplies Co.... 9

Page

F

Ford, Bacon & Davis.......... 38
"For Sale" Ads.............. 41
Frank, M. K................. 41

G

General Electric Co..22, Back Cover
Globe Ticket Co.............. 28
Gold Car Heating & Ltg. Co.... 50
Graham Brothers..Insert 31-32-33-34
Griffin Wheel Co............. 40

H

Hale-Kilburn Co.............. 51
Haskelite Mfg. Corp.......... 39
"Help Wanted" Ads........... 41
Hemphill & Wells 38
Holst, Englehardt W.......... 38
Hubbard & Co................ 50

I

Illinois Steel Co.............. 19
Ingersoll-Rand Co............ 47
International Creosoting & Construction Co. 18
International Harvester Co..... 27
International Motor Co., Insert 11-12-13-14
International Oxygen Co....... 39
International Register Co...... 39
International Steel Tie Co., The. 7
Irving Iron Works Co......... 36
Irvington Varnish & Insulator Co. 39

J

Jackson, Walter 38
Jeandron, W. J.............. 42

Page

K

Kelker, DeLeuw & Co......... 38
Kelly, Cooke & Co............ 38
Kuhlman Car Co............52-53

L

Lang Body Co., The....Insert 43-44
LeCarbone Co. 42
Leece-Neville Co.............. 35
Lorain Steel Co.............. 45

M

Mack Trucks, Inc., Insert 11-12-13-14
Massachusetts Mohair Plush Co. 29
McClellan & Junkersfeld 38
More-Jones Brass & Metal Co... 40
Morganite Brush, Inc......... 37

N

Nachod and U. S. Signal Co.... 50
National Brake Co., Inc...... 23
National Pneumatic Co........ 15
National Ry. Appliance Co..... 45
Naugle Pole & Tie Co......... 50
Norma-Hoffmann Bearings Corp. 40
Nuttall Co., R. D............. 37

O

Ohio Brass Co............... 5
Okonite-Callender Cable Company, Inc., The............ .49
Okonite Co., The............. 49

P

Pantasote Co., Inc............ 42
Perey Mfg. Co., Inc.......... 50
Positions Wanted and Vacant... 41

Page

R

Railway Track-work Co....... 51
Railway Utility Co............ 50
Ramapo Ajax Corp........... 50
Richey, Albert 38
Roebling's Sons Co., John A.... 50

S

Safety Car Devices Co........ 10
Samson Cordage Works........ 50
Sanderson & Porter 38
Searchlight Section 41
Silver Lake Co............... 49
Smith Heater Co., Peter...... 50
Standard Steel Works Co...... 36
Star Brass Works............. 42
Stevens & Wood, Inc.......... 38
Stone & Webster 38
Stucki Co., A................ 50

T

Timken Roller Bearing Co., Front Cover

U

Una Welding & Bonding Co......39
Universal Lubricating Co...... 41

V

Van Loan Corp., Irving S...... 41

W

"Want" Ads.................. 41
Wason Mfg. Co.............52-53
Westinghouse Traction Brake Co. 6
Wharton, Jr. & Co., Inc., Wm.. 45
"What and Where to Buy", 46-48-51
White Eng. Corp., The J. G.... 38
Willard Storage Battery Co.... 24
Wish Service, The P. Edw..... 39
Wood Co., Chas. N............ 50

WHAT AND WHERE TO BUY—Continued from page 48

Tree Wire
Okonite Co.
Okonite-Callender Cable Co.

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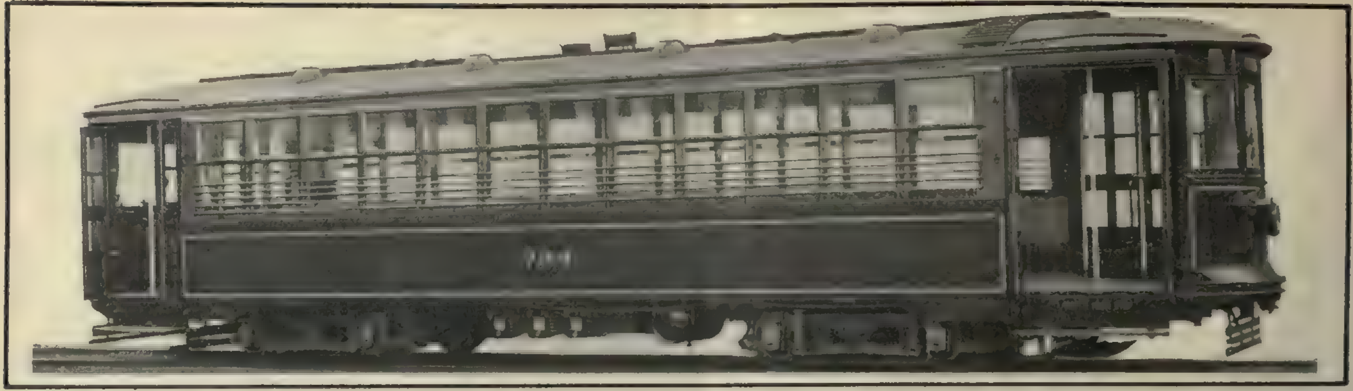

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Wilkes Barre's new cars reflect industry's progressive tendencies

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During the year 1926 there was a marked increase in the number of revenue passengers carried by electric railways. This fact is particularly remarkable considering the greater number of private automobiles used.

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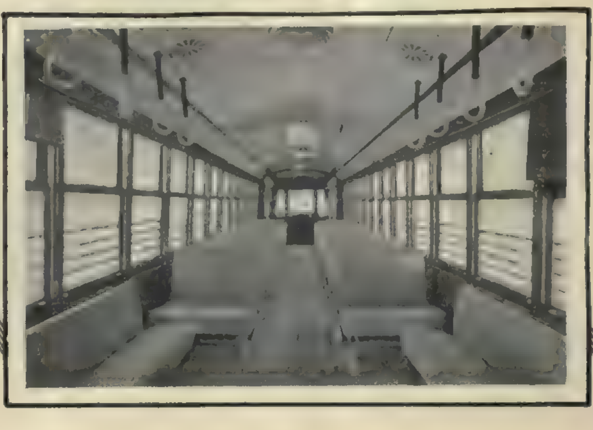

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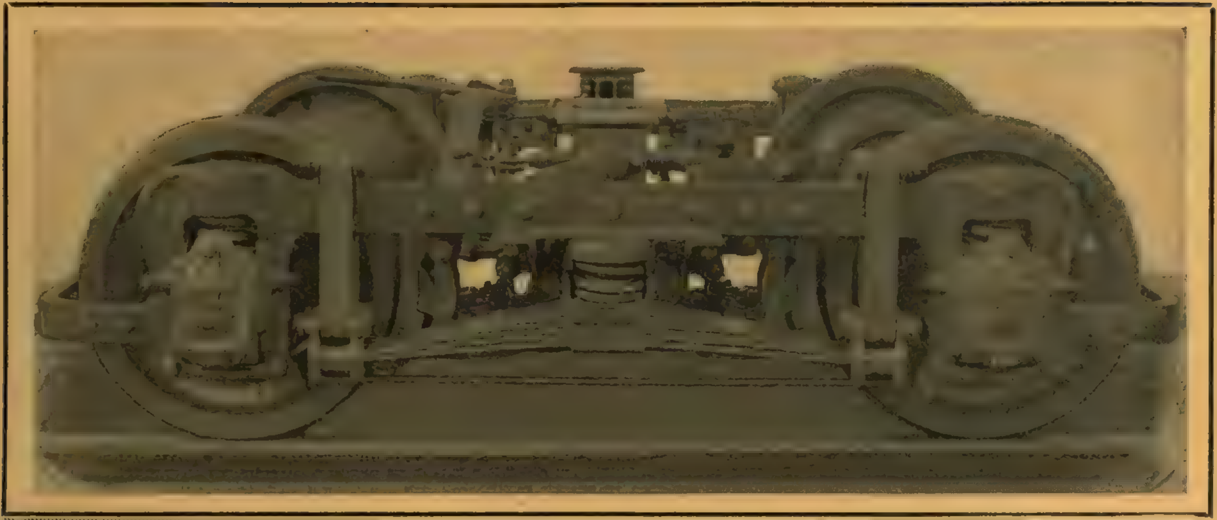
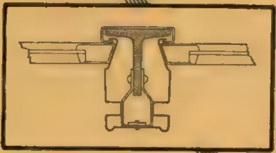


Brill Specialties feature Wilkes Barre's New Cars



In equipping their ten new modern type cars recently placed in service the officials of the Wilkes Barre Railway Company were particular to see that they measured up in every respect to the highest standard. Consequently, Brill 177-E Trucks, equipped with Twin Links, and Brill No. 201-B deep-spring leather upholstered seats were selected to assure maximum riding comfort.

Brill "Renitent" spring brass post casings, Dedenda Alarm Gongs and Exhaust Ventilators were also specified to contribute their part to this truly modern type car.

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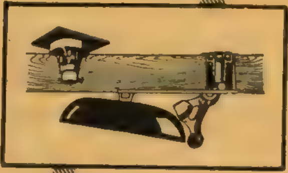
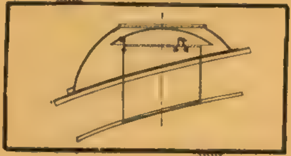
No. 177-E Trucks
Renitent Posts
Dedenda Gongs
Exhaust Ventilators
No. 201-B Seats





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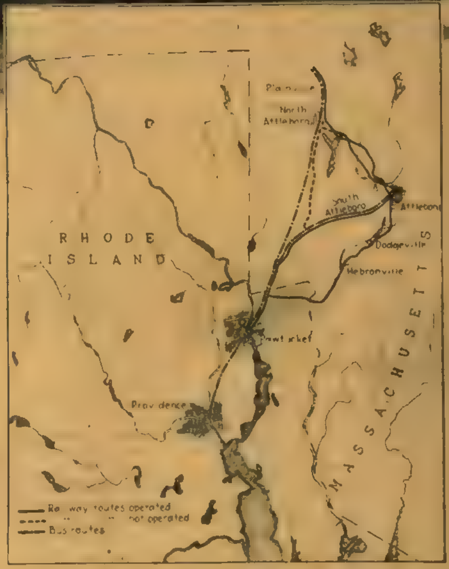

The reduced expenses, and often increased revenue, mean such a large annual return on the investment that modern cars soon pay for themselves—and then they go on earning more than the obsolete cars they replaced.

New light-weight cars help retain railway service for "the Attleboros"

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Equipment	8.11	3.14	4.97¢	61%
Power	8.80	5.43	3.37	38
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Total	37.59¢	25.90¢	12.38¢	33%

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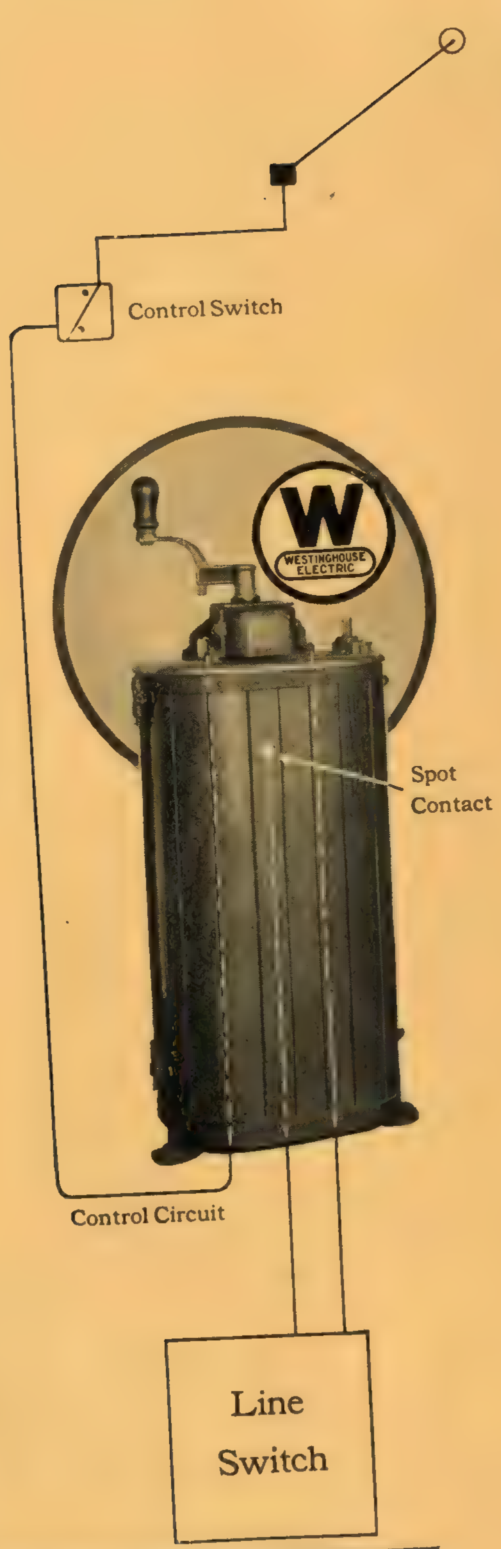

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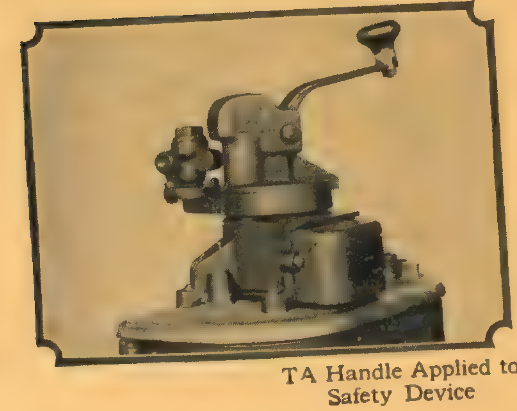

TA Handle Applied to Safety Device

Westinghouse

X88797

Renewal Parts Reduce Maintenance Cost

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Vol. 69
No. 8

CONTENTS

Pages
317-364

FEBRUARY 19, 1927

Editorials 317

Timber Preservation Saves Money on Boston Elevated System 320

More than 500,000 ties installed since 1916 on surface, subway and elevated lines have been treated. Cost per tie per year is estimated to be 35 per cent less than that of untreated ties.

Wheel Fenders Protect Trucks 322

Soldering of Railway Motor Commutators 323

BY JESSE M. ZIMMERMAN.

Satisfactory methods for removing the leads from the neck of commutators preparatory to rewinding are given and soldering operations are described. Pot dipping best when a large number of armatures are to be soldered.

New Cars Selected in Preference to Rebuilding . . . 327

The Milwaukee Electric Railway & Light Company bought 40 new one-man cars, believing that the operating economies possible will pay better than to rehabilitate old equipment that will later have to be discarded.

Screened Refuse Car 329

Maintenance Cost Reduced at Harrisburg 329

Introduction of rigid inspection system, making minor repairs on the road, not filling vacated positions has effected substantial saving.

Correcting Rail Alignment and Repaving 331

Wheels Removed and Pressed on Economically 331

New Plans for North Jersey Transit 333

Studies made by the North Jersey Transit Commission embrace a loop line between Manhattan Borough, New York, and the steam railroads serving New Jersey communities. Alternate plans provide for various contingencies.

Air Equipment Tested in Place on Cars 338

BY ARTHUR W. REDDERSEN.

The Readers' Forum 339

Adventures of Old Man Trouble on the Hicksville Railway 340

Maintenance Notes 341

Association News 346

News of the Industry 352

Recent Bus Developments 356

Financial and Corporate 357

Personal Mention 360

Manufactures and the Markets 363

Straining at the Leash

READER, to appreciate the problems of a publisher, you should drop around at the "dead line," when everyone from copy boy to the press operator is straining at the leash. It is then that you would experience some of the strain and realize that romance enters into the publishing business. Amid the cacophony of rumbling presses and clicking linotype machines, there is always an overpowering sense of responsibility that nerves each editor, in fact everyone who enters into the production of the "book," to see that there are no errors and that last minute news is included in the edition.

When ELECTRIC RAILWAY JOURNAL reaches the "dead line," every man is at his post, conscious of his responsibility, a responsibility accepted as part of the game, but nevertheless one that never fails to inspire those upon whom it rests. This sense of responsibility makes your JOURNAL accurate, informative, and the criterion of all that is best in the electric railway industry. It is this straining at the leash that brings romance and excitement as well as enormous responsibility to the publisher. He accepts it gladly, if conscious that his reward will be the unqualified support of his readers.

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SAVING THE RAIL SAVES THE RAILWAY

"Of course"

"Of course, in connection with the cars, we have also put forth every effort to keep the track in good condition,

"because a good car operating over a rough track will not give a smooth ride and the public insists on having the smoothest ride possible."

Attractive cars and frequent service solved Fort Wayne's problem. Mr. Henry Bucher, Manager Railway Dept., Indiana Service Corp., wrote this paper how well the public responded. His letter was printed in the February 5th issue. The last paragraph, quoted above, is the very essence of the new-car philosophy.

Take the first step first—make sure the track is right. Grind out corrugations, bumps and thumps. Build up the low spots by arc welding. Here's modern equipment that makes track maintenance cheaper.

Quotations?

Railway Trackwork Co.

3132-48 East Thompson Street, Philadelphia

AGENTS:

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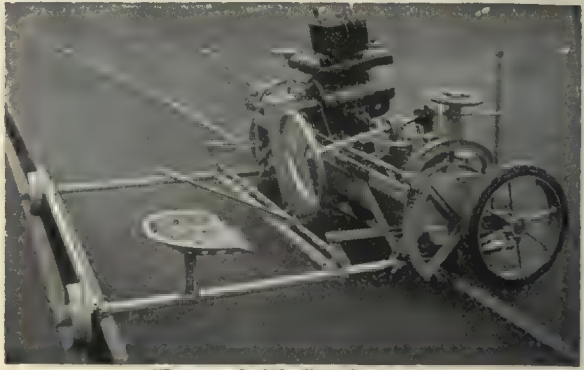
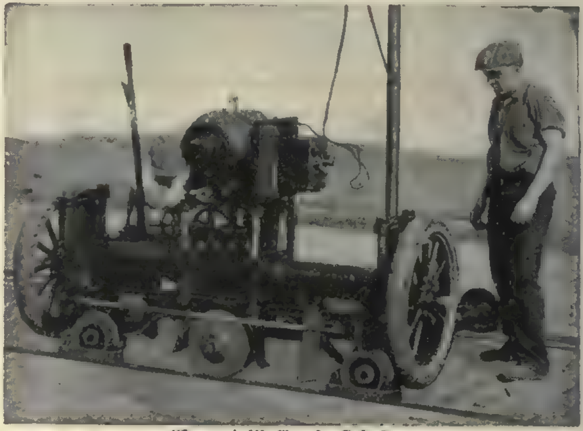
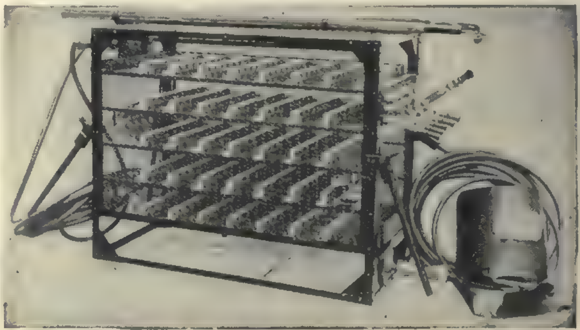


"Improved Atlas" Rail Grinder



"Imperial" Track Grinder

Reciprocating Track Grinder

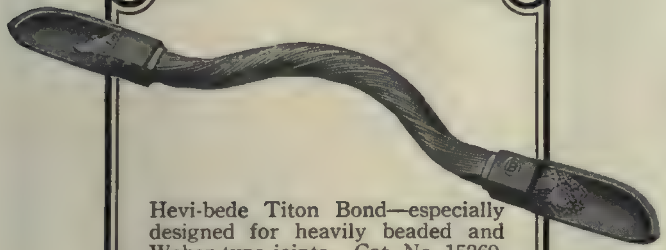


"Ajax" Electric Arc Welder

O.S.T.—1594

SAVING THE RAIL SAVES THE RAILWAY

Good Bonding Pays—
and O-B Bonds make it easy to collect



Hevi-bede Titon Bond—especially designed for heavily beaded and Weber type joints. Cat. No. 15269.

Titon Bond—for rail-head application on standard joints. Note large steel terminals. Cat. No. 14841.

AW-12 Bond—for base of rail. The tap of a hammer wedges the terminal firmly to rail before welding is started. Cat. No. 14776.

O-B IS BOUGHT
WHEN SERVICE IS SOUGHT

KEEPING your track circuits working at top notch efficiency with O-B Bonds is worth all of its small cost, and more. It is a *paying* investment. First of all, you avoid the loss of a large percentage of your return current. Secondly, with the stopping of leaks caused by worn, loose, or improperly applied bonds, you prevent voltage drops which affect motor equipment and schedules, and tend to overload the whole system.

O-B Bonds make good bonding easier. Design and construction features are provided which insure a good strong weld, large contact area, and permanently low resistance, with the minimum of time and effort required in installation.

Three widely used O-B Copper Arc Weld Bonds are shown here. They have proved popular on hundreds of properties with both welding crews and distribution men. Ask us to send you a sample bond and complete information. Address

Ohio Brass Company, Mansfield, Ohio
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada
2898

Ohio Brass Co.

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
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MINING MATERIALS
VALVES

ASF

Balanced Braking

In line with modern principles

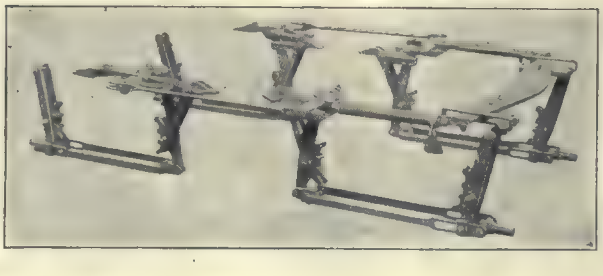
Higher rates of retardation are demanded as a part of the program of speedier suburban and street railway service. With two brake shoes per wheel instead of one, the clasp brake is admirably suited to producing maximum retarding effect, with minimum strain and wear on truck and journal parts.

Balancing the heavy braking forces on opposite sides of the wheel has many advantages

1. **Less journal box wear.**
2. **Permits wheel to follow freely, vertical inequalities in track.**
3. **Makes use of flanged brake shoes practical.**
4. **Higher co-efficient of friction.**
5. **Divides energy absorption between two shoes, thus reducing heating effect from brake application.**
6. **Reduces frequency of brake shoe replacements on the car.**

AMERICAN STEEL FOUNDRIES
NEW YORK CHICAGO ST. LOUIS

American Multiple Unit Clasp Brake



For buses

For electric railway cars

Daylight safety in night operation!

GOLDEN GLOW HEADLIGHTS

By projecting powerful and well concentrated beams of light, that are non-blinding and non-dazzling, Golden Glow Headlights make night operation safe in all kinds of weather.

The special glass reflector absorbs the violet and blue rays—thereby producing a beam which penetrates rain, snow and mist better than a brilliant white light. The reflector being of glass will not tarnish or corrode. It's a permanent reflecting surface.

Complete particulars of the various styles and sizes of Golden Glow Headlights sent on request.

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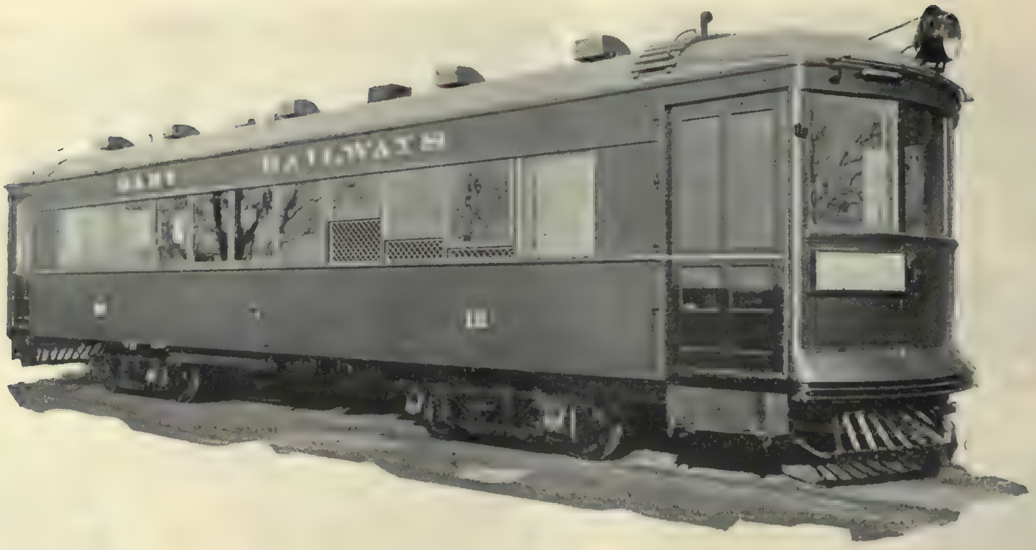
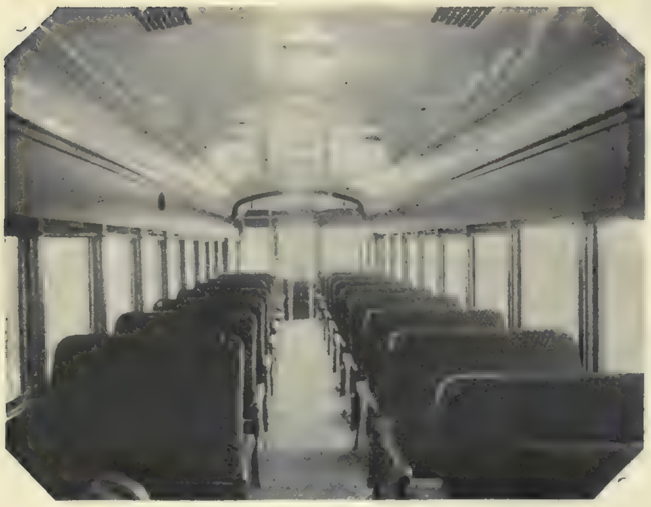


New Type Interurban Cars Attract More Riders

Gary Railways' Patrons are Enthusiastic in appreciation of new Equipment



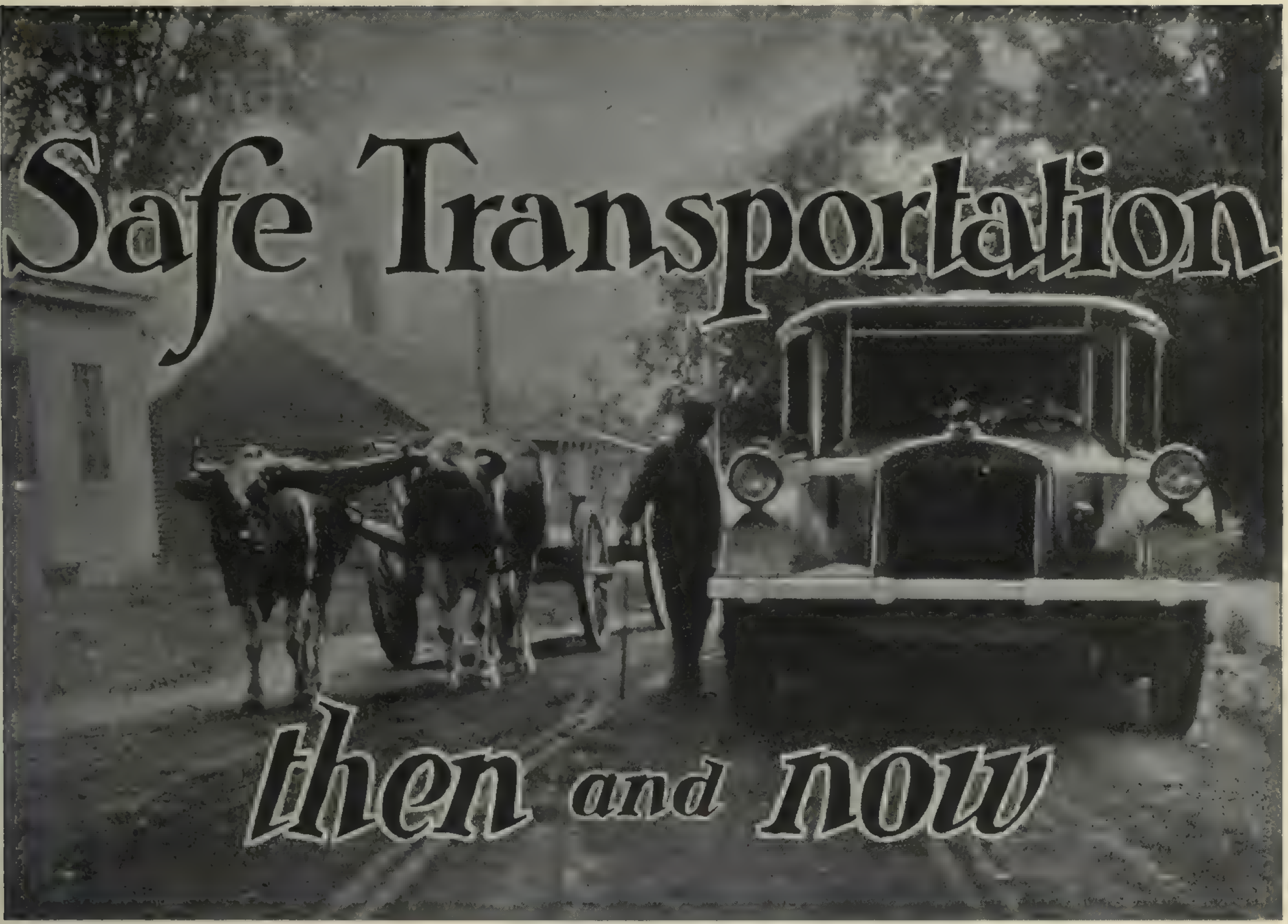
Interior view, showing dome lighting, plush seats, metal sash, etc. Notice on the exterior view, above, that the window guards raise with the windows.

SEVEN new light-weight one-man cars of the type illustrated were recently placed in service by the Gary Railways, for interurban work between Gary and Hammond, Indiana. These cars replace heavy two-man cars of older type. The line serves several steel mill towns, and the traffic is heavy, particularly during the rush hours, when thousands of mill workers are carried to and from their work.

Previous to being placed on the line the cars were exhibited for several days. During the exhibition and since the inauguration of the new service, visitors and passengers alike have expressed their enthusiastic approval of the new cars.

Plush seats, dome lights, linoleum floors, treadle operated exit, safety features,—in other words, all the characteristics of the *modern* car, are found in these new cars, built by

CUMMINGS CAR AND COACH COMPANY
Successor to McGuire-Cummings Mfg. Co.
111 W. Monroe St., Chicago, Ill.



Westinghouse Air Brakes

—develop a retarding force sufficiently powerful for stopping even the heaviest bus quickly to increase safety and permit faster schedules.

—provide automatic equalization to minimize skidding and lengthen life of brake linings.

—relieve the driver of braking fatigue to increase safety and utility.

OLD fashioned conveyances were safe, but slow.

Today we demand that every means of transportation at our disposal be rapid, as well as safe.

The automotive industry is producing motor coaches that are commodious, comfortable, "get there quickly," and are SAFE, because—

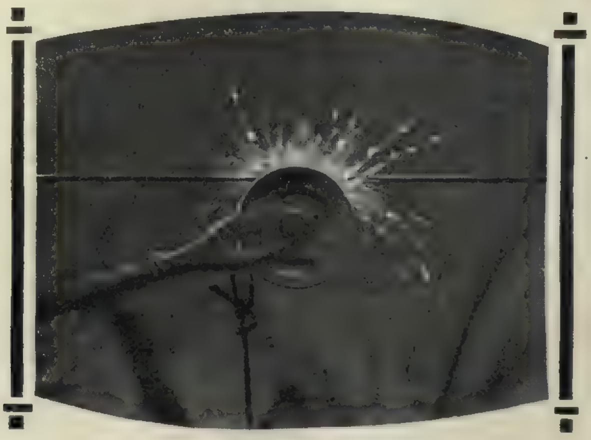
Westinghouse Air Brakes are now recognized by leading bus builders as the most satisfactory means of safeguarding highway transportation.

"Pioneers and specialists in air brake development and manufacture since 1869."

WESTINGHOUSE TRACTION BRAKE CO.
Automotive Division, Wilmerding, Pa.

WESTINGHOUSE
AUTOMOTIVE AIR BRAKES

PHONO-ELECTRIC OVERHEAD IS A MEASURABLE ECONOMY



Arcing bites deep into wire "mileage"

higher trolley tension
and better wheel inspection
will help reduce it

Some roads have considerable trouble with arcing at the trolley wheel. Others have little or none. Yet actual operating conditions are in most cases very similar.

On analysis such a condition is traceable in part to differences in the stringing tensions of individual installations and in part to careless inspection of trolley wheels.

In this connection the higher tensile strength of Phono Electric Trolley Wire becomes interesting. For it is a fact that, where Phono is strung at the higher tension made possible by its greater tensile strength and careful inspection of wheels insisted upon, arcing is very materially reduced,—this in turn resulting in appreciably longer wheel life and less wear on the wire.

Such things are important when considering modern overhead for modern operating conditions. We will gladly send you the "Phono Book" containing a useful table of relative stringing tensions together with other essential wire data, on request.

Phono-Electric
The triple-wear Trolley Wire

Phono Hi-Con
Conductivity up to 80%

Phono Hi-Strength
the corrosion proof messenger

Bridgeport Brass Co "Bridgeport" Bridgeport Connecticut

BRASS CO. TRADE MARK

A COMPLETE WIRE SERVICE FOR ELECTRIC RAILWAYS

Wilcox High Speed Bus Equipped with 6 Cylinder Waukesha Engine

(A-709-LC)

Waukesha in the Northland

From Minneapolis to Duluth with its many railroad crossings, towns and almost impassable detours these Wilcox, Waukesha Equipped buses have to maintain railway speeds and schedules summer and winter. After more than a year's service in competition with the best buses made in America it is significant that the Northland Transportation Company operating them is putting more and more Waukesha Equipped Buses in their service.

Waukesha Heavy Duty Six Cylinder Bus Engines are different in design and performance from all other engines in this service. They have the "Ricardo Head," which gives greater power and fuel economy and also eliminates "pinging." The dual cylinder heads prevent head trouble. "Truncated Cylinders" give longer life and more uniform lubrication, "Girder Type" crankcase insures great rigidity and combined with a large crankshaft insures vibrationless performance. These are only a few of the features. Write for "Six Cylinder Bulletin," giving more information about them.

(A-712-LC)

AUTOMOTIVE EQUIPMENT DIVISION

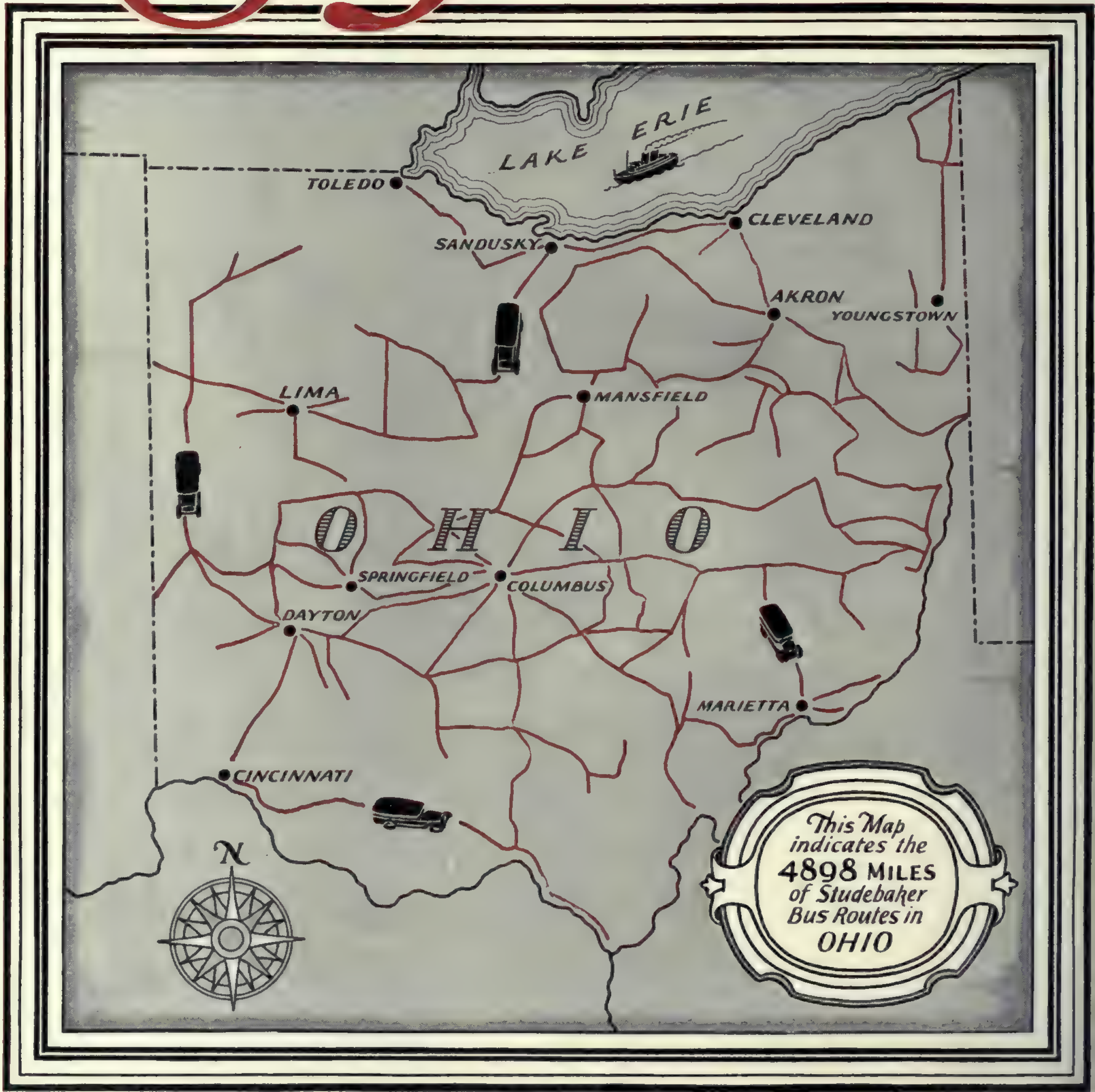
WAUKESHA MOTOR COMPANY

Waukesha **Wisconsin**

Eastern Sales Offices Aeolian Building, 33 W. 42nd Street New York City

Exclusive Builders of Heavy Duty Automotive Type Engines for Over Twenty Years

39½ per cent



IT IS significant that within the short space of two years, Studebaker busses have won a position of leadership in Ohio, a pioneer motor bus state.

Experienced operators were quick to recognize the outstanding qualities of Studebaker equipment and today of the 1,049 busses of 43 different makes operating in the State of Ohio, 415 are Studebakers.* The next three makes have 129, 99 and 64 respectively. This gives Studebaker 39½ per cent of the total and a decided dominance over all other makes!

Such popularity is based on three major advantages which Studebaker equipment offers the operator. First, the lower initial cost; second, the extraordinary long life; and third, the outstanding economy of operation of Studebaker busses.

*Taken from the Ohio Public Utility Commission's records of Franchise Registrations.

STUDEBAKER

of all Ohio Busses are STUDEBAKERS

Seven Reasons Why Studebaker Busses Predominate

1 ***Power*** According to the ratings of the Society of Automotive Engineers the specially designed Studebaker bus chassis is the most powerful of its size and weight in the world.

2 ***Low Maintenance Cost*** The fact that Studebaker busses stand up under the most severe service minimizes the need of repairs. But the simplicity of Studebaker construction is a big factor of economy, for it results in reduced labor costs, when repairs are necessary. Every part of the chassis is easily accessible. Studebaker cylinder heads are removable.

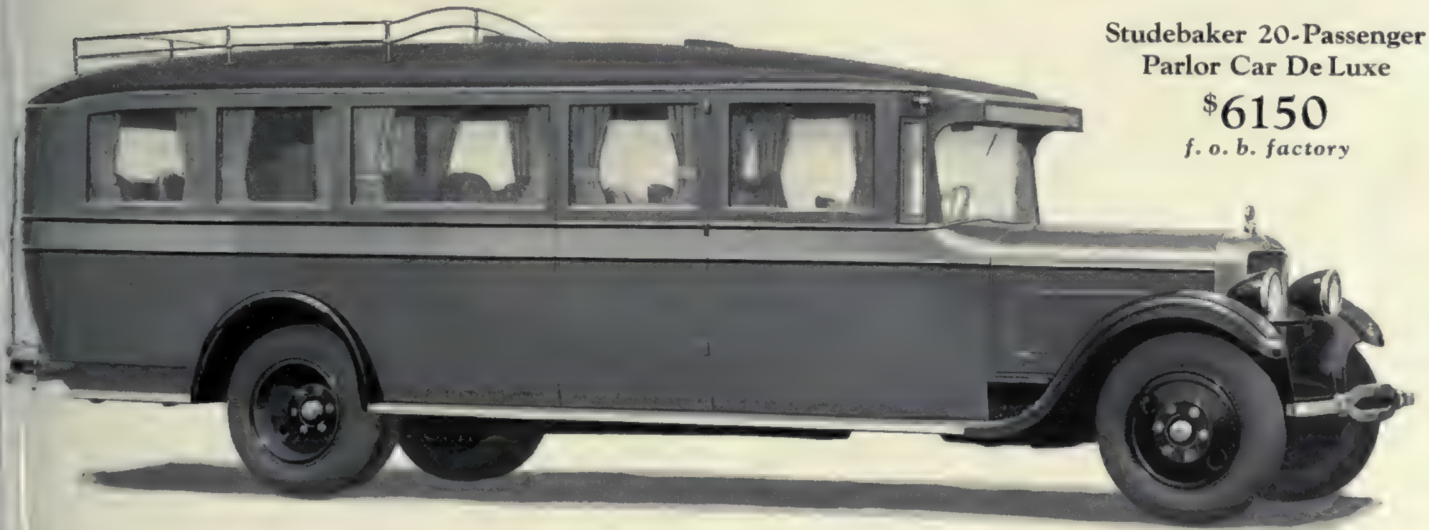
3 ***Low First Cost*** Large scale production in modern plants by the most efficient methods of manufacture reduce production costs of Studebaker busses to a minimum. Economies thus effected enable Studebaker to offer greater bus values. Complete Studebaker busses, costing five to six thousand dollars, are comparable only with busses selling from ten to twelve thousand dollars.

4 ***Remarkable Mileage*** Every Studebaker chassis has tremendous mileage built into it. Only the finest materials are used. Premiums are paid for special alloy steels. As a consequence every Studebaker unit is capable of delivering at least 100,000 miles of dependable service. This is proved by a recently published list of 256 Studebaker busses having mileage figures ranging from 100,000 to 300,000 miles each and which are still in service.

5 ***Proper Size*** Studebaker busses weigh 50 per cent less than the average bus and are operated for 25 to 50 per cent less than the average truck type bus seating from 25 to 30 passengers. When the average load of 10 passengers is carried the Studebaker bus requires only 5 passengers to pay operating costs while the average 25 passenger bus requires 8 passengers. Thus the Studebaker bus carries 5 profit producing fares (on the average load) as opposed to 2 profit producing fares of the larger capacity bus.

6 ***Lower Depreciation*** Compare the cost of a Studebaker at $6150 and the cost of a large truck type bus at $10,000, each turning an average of 50,000 miles annually, the depreciation figured at a conservative 20 per cent is but $1230 or 2.5 cents a mile for the Studebaker against $2,000 or 4 cents a mile for the larger type bus.

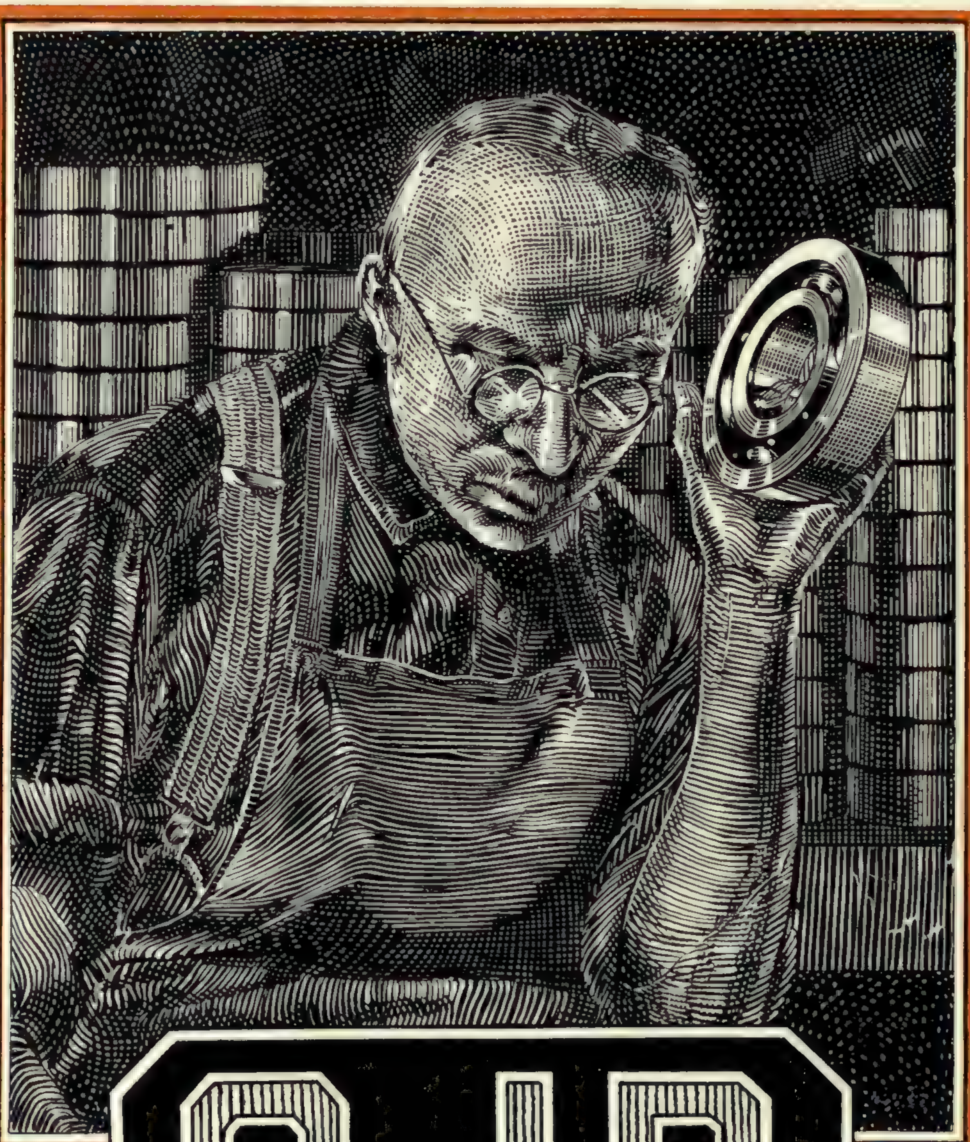
7 ***Economy*** An investigation of operating costs of six different bus chassis in 8 cities showed that it cost seven to nine cents less per mile to operate a Studebaker bus.



Studebaker 20-Passenger
Parlor Car De Luxe
$6150
f. o. b. factory

BUSSES

More profit per Passenger Mile



CJB

MASTER BALL BEARINGS

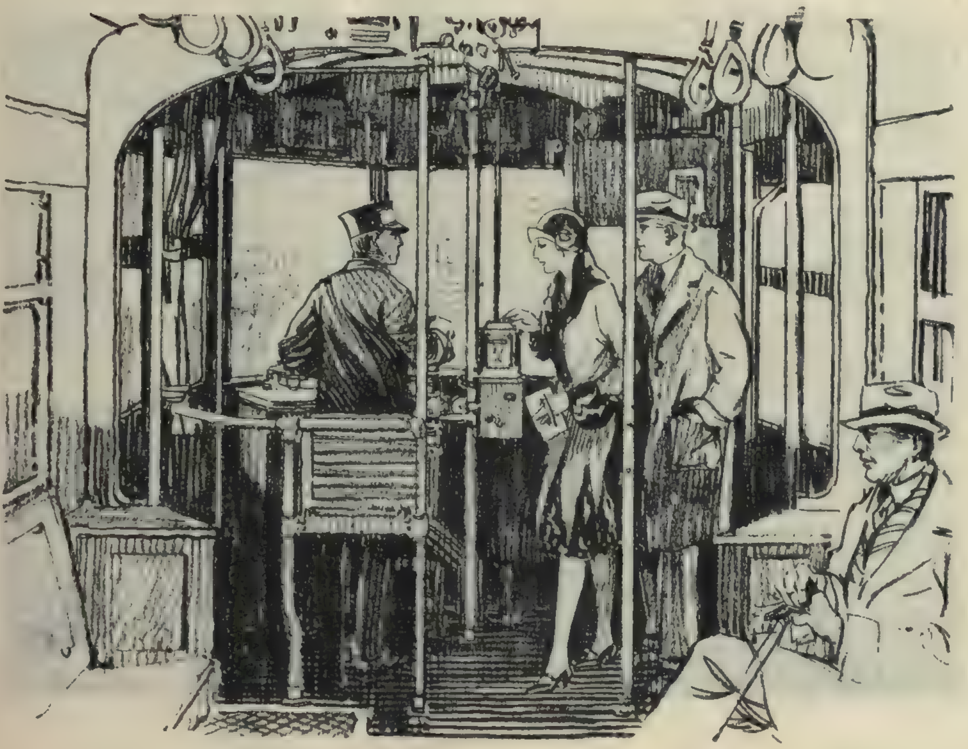
Made by Master Craftsmen

The only ball bearings in the world made by highly skilled men using the exacting methods of old world precision and the most efficient machines developed by new world genius.

Back of this, lie 16 years experience and the largest active service organization with thirty-five branches. Ahlberg engineers are always ready to co-operate with users of ball bearings regardless of requirments.

This advertisement is number one of a series picturing the thoroughness of Ahlberg Methods.

AHLBERG BEARING COMPANY
321 East Twenty-Ninth Street :: Chicago
Branches in Thirty-five Cities



The Operator of the One Man Car

When passengers are boarding or alighting, the operator of the one man car has his hands full. He must be motorman one minute and conductor the next.

Automatic Treadle Exit Door saves him both physical and mental labor and enables him to do his double job as speedily and as efficiently as it is done in two-man operation.

National Pneumatic Company
Executive Office, 50 Church Street, New York
General Works, Rahway, New Jersey
CHICAGO
518 McCormick Building
PHILADELPHIA
1010 Colonial Trust Building
MANUFACTURED IN TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

Car Shop Efficiency and Lubrication

It goes almost without saying that the more efficiently a car shop is operated, the more cars will be kept on the road. Supervision of the work in the shop to keep men and machines working at full capacity is the golden rule.

But the machine must be in a position to respond fully. There is where correct lubrication—the Texaco kind—enters. We say the Texaco kind advisedly, for we have the proof—the only proof that counts—*results*—to back this up. Texaco shop lubricants have a record of performance in shops of all kinds, and numbers of builders of machine tools and equipment, such as lathes, planers, boring mills, drills, presses, cranes, etc., recommend Texaco Lubricants, because they are satisfied that Texaco will aid the record of the machines they make and sell.

Supporting and enhancing the excellence of Texaco Shop Lubricants is the service of Texaco Lubrication Engineers.

Our staff includes experts on shop lubrication, who will make a survey of your shop and tell you which Texaco Lubricant to use for the various machines and parts.

Through efficient recommendation it is more than likely that they will be able to show you how to do the work with fewer lubricants.

This is helpful in more ways than one. It decreases the chances of confusion; it decreases the storage space necessary; it simplifies orders on the Supply Department for oils; it assists in the better operation of machines through standardization of methods of selection and application of lubricants.

Let us assist you in securing topnotch shop efficiency through correct lubrication.

There is a Texaco Lubricant for Every Purpose

TEXACO T REG. U.S. PAT. OFF.

THE TEXAS COMPANY
DEPT. R.J. 17 BATTERY PLACE - NEW YORK CITY
HOUSTON - CHICAGO - NEW YORK
OFFICES IN PRINCIPAL CITIES

TEXACO T REG. U.S. PAT. OFF.

BALANCED DESIGN

—the maintenance economy of INTERCHANGEABLE parts

If BALANCED DESIGN had given no more than this to the Electric Railway Industry it would have contributed an essential to profitable modernization.

Whether you take delivery of ten or a hundred Cincinnati NEW cars of any given type, you will find absolute conformity to specifications in every smallest detail.

No "patchwork," no after-thoughts or misfits!

More than this, every unit used in the building of each of these cars will be interchangeable with similar units on the others or with additional units purchased for replacement.

Repair and maintenance work is reduced to an absolute minimum. Out-of-service time becomes a matter of hours where previously days or even weeks were usual.

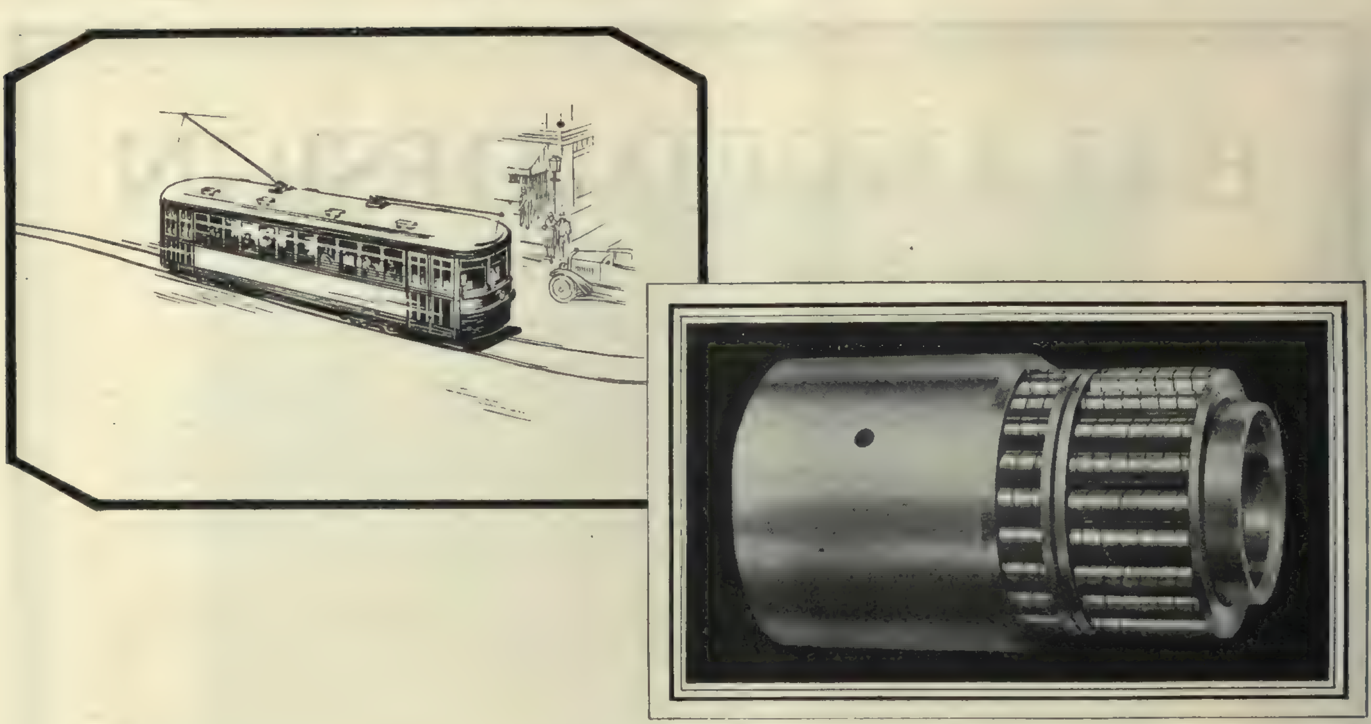
In one actual case reported to us, a car which had been badly damaged was rebuilt and put back into service within 48 hours.

Such facts speak for themselves. You owe it to your property to investigate the advantages of BALANCED DESIGN as applied to Cincinnati Lightweight NEW cars.

CINCINNATI CAR COMPANY
Cincinnati, Ohio

CINCINNATI
New
CARS

A step ahead
of the
modern trend!



True Anti-Friction Bearings for railway car journals

Hyatt Roller Bearings take the jolt out of railroading.

They promote smooth and rapid acceleration—coasting instead of pulling. Their motion is frictionless.

Rain, snow and dust cannot interfere with their easy operation.

Hyatts consume but a fractional part of the oil which brass bearings require. Their mileage is several times greater in comparable service.

Hyatts are true anti-friction bearings—and are unusually quiet.

A mechanical engineer from the Hyatt Railroad Department will be glad to present some interesting facts on operating economy.

HYATT ROLLER BEARING COMPANY
NEWARK, NEW JERSEY

HYATT
QUIET ROLLER BEARINGS
PRODUCT OF GENERAL MOTORS

"STANDARD"
STEEL PARTS

Appreciation for a
"Fundamental Service"

Street car service is absolutely fundamental in the life of modern communities. Good wheels, springs and axles are absolutely fundamental in the operation of a street car. The public is just beginning to appreciate that street cars utilize the thoroughfares in the most economical manner but railway operators have long since appreciated the economy of "Standard" Steel Axles, Armature Shafts, Wheels and Springs.

STANDARD STEEL
WORKS COMPANY

PHILADELPHIA, PA.

BRANCH OFFICES:

CHICAGO
ST. LOUIS
NEW YORK
HOUSTON, TEXAS
PORTLAND, ORE.
RICHMOND, VA.
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ST. PAUL, MINN.
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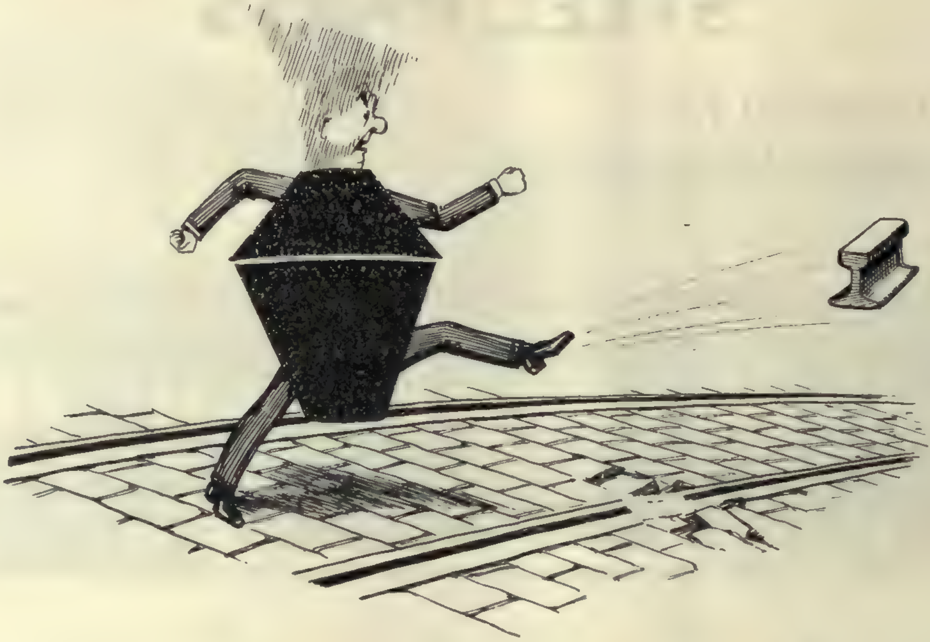

Beat it—Dutchman!

You know that miserable make-shift repair—the Dutchman! That little hunk of rail you poke in where a rail joint has gone too far to build-up.

What a poor excuse for a job it is—two joints now to maintain instead of one.

Why not do it right—with a Thermit Weld, the one successful and inexpensive method of prolonging the life of old track.

THERMIT WELDS

If there's any useful life left in the rail at all, Thermit Welding is the way to get it out. Let us tell you how track reconstruction jobs have been postponed for years on other properties,—without prejudice to riding comfort or car maintenance cost.

THERMIT

THERMIT

METAL & THERMIT CORPORATION

120 BROADWAY, NEW YORK, N.Y.

PITTSBURGH CHICAGO BOSTON SOUTH SAN FRANCISCO TORONTO

Insulating Varnishes

help to keep motors in service

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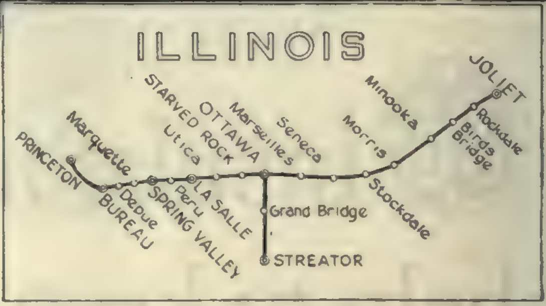
Through specific figures, facts are revealed. Experience of a few years with modern light-weight cars, both city and interurban, has furnished convincing proof that new revenues can be developed and substantial savings effected.



A significant page from recent Illinois Traction history

In 1924 this company replaced its 94,000-lb. interurban cars, operated on the Illinois Valley Division, with new 37,000-lb. one-man cars and decreased its headway from 2 hours to 1 hour. The financial gain realized in 1925 from operating these modern cars, which are all equipped with G-E Motors and Control, is indicated by the following facts:

> Although two more city cars were operated on the system than in 1923, there was a reduction of 33% in the shop force.
>
> Even with an increase of 70% in interurban passenger car mileage, operating expenses were less by $39,000.
>
> On account of the more attractive cars and reduction in headway, passenger revenue increased $33,000—the total savings, therefore, being about $72,000 or a gross return of about 39% on the investment.
>
> Of 22,239 trains operated in 1923, 92% were on time; in 1925 the number of trains increased to 32,858, of which 97% were on time.

The comparative operating costs per car-mile for accounts affected by the new cars are:

	1923	1925	Saving per C. M.	% reduction
Equipment	3.60	0.95	2.65	73
*Power Purchased	5.80	3.35	2.45	42
Platform expense	5.17	3.75	1.42	27

**All service*

This achievement in improving service and lowering costs of operation is another instance of the success of modern G-E Car Equipment. For these new Illinois Traction cars, G-E-265 Motors with K-35 Control were selected.

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

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Equipment Men's Conferences Worthy of Active Support

COMPARATIVELY new is a phase of sectional association activity represented by the rapid development during the last few years of territorial conferences among groups of maintenance men. Two groups worthy of mention are the Electric Railway Association of Equipment Men, Southern Properties, and the Central Electric Railway Master Mechanics' Association. A report of the recent Toledo meeting of the C.E.R.A. men is published elsewhere in this issue. The meeting of the Southern equipment men in Memphis was reported in the Feb. 5 issue of the JOURNAL.

Both of these bodies have become actual working conferences of maintenance executives rather than merely sectional association meetings. That the men who take part mean business is apparent to any one who has attended their meetings. Better acquaintance, good fellowship and sectional spirit are desirable and laudable objectives of sectional association activity. But these maintenance men go much further than that. They make a critical comparison of their practices and methods and express their ideas as frankly as in a staff conference on their own properties. Their purpose is to find their own shortcomings, and that is the road to progress. General executives of the properties located in the territories covered by these maintenance groups may well afford to lend full measure of their support and backing.

Greater Interest Is Warranted in Economies of Treated Timber

OPPORTUNITIES to make substantial savings by preservative treatment for ties and timber that are used by electric railways have been much neglected. During the past three or four years there has been a slight increase in the interest shown in this important subject by electric railway mangements, but it has lagged far behind that shown by the steam railroads. General adoption of a policy of obtaining the maximum life of all timber used undoubtedly would save the industry a large sum every year.

Desire to keep the initial expenditure to a minimum is probably the principal reason why electric railways have continued to use large quantities of untreated timber. This is a penny-wise and pound-foolish policy, as in many cases the untreated wood deteriorates rapidly. The criterion of economy is the annual cost rather than the initial. In this connection, the experience of the Boston Elevated Railway, as given in an article elsewhere in this issue, is a convincing argument in favor of preservative treatment. On that system the cost per treated tie per year is only 8.7 cents as compared with 13.3 cents for untreated. Thus treatment has reduced tie cost approximately 35 per cent.

Another important factor not always appraised at its full value is the possibility of using a cheap grade of timber when preservative treatment is applied. In Boston, standard or merchantable grade is now employed for many purposes where previously it was considered necessary to use only hard timber of first quality. Judging by the experience of this company, it appears that the economy claimed for the policy of using untreated timber because of its lower initial cost is largely fictitious, and that real economy in the long run will result from greater use of the preservative treatment process. Moreover, in view of the dwindling supply of timber in this country its conservation by every means has become a moral obligation which should be heeded before increasing costs due to scarcity makes it a financial one.

A Damaged Commutator Invariably Means Expensive Rewinding of the Armature

SO MUCH depends on the perfect operation of a railway motor armature that it is important to keep it in as good operating condition as possible. Even though the armature may appear rugged, the component electrical parts must be insulated from the metal core. This necessarily makes some of these parts relatively delicate. It is a rather simple operation to insulate and support the armature conductors in the core, but to insulate the commutator bars from each other and then insulate the entire assembly from the core and from the shaft makes the problem more difficult.

Nearly every commutator failure that occurs today means a new set of armature coils and a labor charge to strip and rewind the armature, while a coil failure usually does not affect the commutator. Therefore, when purchasing a set of assembled segments to refill a commutator, they should measure up with the highest material and workmanship standards. These requirements are the result of costly investigation over a period of years by both manufacturers and operators.

It is also essential that the commutator be assembled correctly. A certain railway purchased a set of assembled segments to refill a commutator. These met all the requirements of a good specification and the commutator was placed on the armature and the motor returned to service. During the morning rush period of the first day the motor was in operation the motor failed. The trip was completed in order not to tie up traffic, but the commutator bars were strewn along the track. When the car returned to the carhouse and an inspection of the motor was made it was found that the

This is the issue in February that is devoted essentially to maintenance and construction subjects

commutator structure had loosened and all of the bars were missing. The armature and field coils were damaged beyond repair. The brush-holders had broken from their supports and lay in the bottom of the motor case.

Due to the damaged condition of the motor it was impossible to determine the cause of the failure. It seemed most probable that there had been improper assembling of the commutator on its spider. Evidently the holding nuts had loosened to such an extent that the bars had come out of the V rings. Proper methods had not been used to tighten the assembly and to insure that the whole structure had been heated sufficiently to secure a permanently tight fit. Probably it had not been inspected cold to be certain that the bars were tight.

Had the commutator been assembled according to the specifications laid down by the original manufacturer, with the use of tools which insure high-grade workmanship, the accident would not have happened. The series of articles on commutators by Jesse M. Zimmerman which has been running in the maintenance issues of ELECTRIC RAILWAY JOURNAL gives in detail the practices of one manufacturer. While the practice of leading railway motor manufacturers may differ slightly in minor details, their general manufacturing principles and standards are comparable. By adopting for maintenance operations the methods set forth in this series of articles the number of armature failures should be reduced materially.

What Is a Pull-In?

PULL-IN records are of great value in determining the condition in which a property's equipment is maintained. But a large part of this value is lost unless such records for one property are comparable with those of another. Discussions of this subject have appeared before in the JOURNAL. There is still, however, a wide variation in the definition of a pull-in as applied by various properties. Because of this, comparisons which should serve as a stimulus toward better maintenance practice are frequently very misleading.

There are several classes of pull-ins. Some are chargeable to the mechanical department, others to the transportation department and still others to causes beyond the control of the company. In this latter class come cars disabled by certain types of accidents. A pull-in record, to be of real value, should include a report of every car that is withdrawn from service before completing its scheduled run. With such a broad interpretation as a beginning, the basis for classification may be fixed by definition, so that pull-ins chargeable to the mechanical department for defects in equipment, and to the transportation department for improper operation, may be determined.

After all, the broad purpose of pull-in records is to stimulate avoidable interruptions to passenger service. Only when the records of various properties are on a comparable basis do they serve to stimulate that effort toward improvement from which progress grows. The mechanical man who makes an honest effort to find out how his performance compares with that of other properties would, of course, welcome any step toward uniformity of definition which would increase the value to him of comparative records. The Association of Equipment Men, Southern Properties, has established a set of rules for determining pull-ins, as was outlined in a letter by A. D. McWhorter, its president, in the Jan. 15 issue of the JOURNAL, page 128. This work should be extended. It appears to be a subject which warrants study by the American Electric Railway Engineering and Traffic & Transportation Associations. Once the proper definitions are laid down and followed by member properties, pull-in records will become of much more value than they are under present conditions.

Opposition to One-Man Cars Is Based on Lack of Knowledge

FROM several quarters attacks have been launched recently against the use of the one-man car. Among these Buffalo, Toronto and Montreal are perhaps the most prominent. In practically all cases, in these and other cities as well, the objections raised have been mainly of a political nature. Organized labor has been a factor, although the national officers of the Amalgamated Association are on record in favor of the one-man car as a progressive step and one which will redound to the advantage of the men themselves.

Those who argue against the one-man car do so without knowledge of the facts. Far from being an experiment, it is one of the most striking successes in the transportation business. There is not a state in the Union nor a province in the Dominion of Canada where one-man cars are not used. They have been found successful on the smallest properties and the largest. In the Borough of Manhattan, New York City, one-man cars are giving satisfactory performance at certain times of the day, as well as all day on Sundays. Across the Hudson River the Public Service Railway of New Jersey uses one-man cars exclusively, operating some 1,200 in regular service, many of them through the heart of Newark, one of the largest American cities.

A stock argument against the one-man car is that it increases the accident hazard. That this is incorrect is shown by the record of practically every property that is a user of this type of equipment. The results obtained by a group of properties under a well-known utility management firm is typical. This group of properties covers a wide territorial range, so that local conditions do not enter to any great extent. In the four years 1922-1925, during which the proportion of one-man car-miles increased from 48.7 per cent of the total to 84.6, the passengers carried per person killed or injured went up from 52,000 in the earlier year to 64,000 in the later. The average cost of the accidents has remained practically stationary, going from $23.63 to $23.86. What increase there was came from greater seriousness of accidents with two-man cars, as the cost for these went up from an average of $23.78 to $28.08, while the cost per accident with one-man cars went down from $23.78 to $23.07 in the same period.

As to schedule speed, now that operators are thoroughly familiar with the method, there is little or no difference between one-man and two-man service. In fact, some companies obtain higher schedule speeds with the one-man car, particularly if small numbers of passengers board at one stop, or if the fare system makes it possible to collect all fares outside the congested district. The advantages of lower operating cost and possibilities of more frequent service are so well known that it is not necessary to reiterate them here.

No one thinks of requiring two men to operate the ordinary type of bus. Yet the driver has to do everything the operator of the one-man street car must do, and in addition he has to steer his vehicle in and out of a maze of traffic.

When action is contemplated inimical to the one-man car, it is well that the legislative or regulatory body become familiar with the facts. They are public property, and it is the duty of the public official not only to acquaint himself with them, but to see that he does nothing that will injure or perhaps stifle one of the public's most essential utilities.

Engineering Supervision Over Maintenance Is a Step in Right Direction

SUCH momentum has been gained by the modernization idea of improving the appearance and comfort of cars that it has now covered the entire country. In most instances the approval of the public is evidenced by the increased revenues. This favorable public attitude can only be perpetuated by maintaining reliable and uninterrupted service. Without such continuity of service all the comfort and all the fine appearance will at once lose their appeal. Reliable service cannot be rendered and road failures decreased unless the shop practices are systematized so that the equipment receives thorough inspections and overhauling on a definite basis, which is given at such intervals that failures are anticipated rather than checked up after they have occurred on the road. Appreciating the importance of this situation, the management of the New Orleans Public Service, Inc., reorganized that company's shop organization and placed the most important work under the direct supervision of a field engineer. The results obtained have been most encouraging. The company's 1926 report shows the remarkable average of 261,084 miles per car pull-in due to equipment failures, and a maintenance cost of $20.39 per 1,000 car-miles. A. J. Naquin, this company's engineer of rolling stock and shops, in a paper presented before the Electric Railway Association of Equipment Men, Southern Properties, which was abstracted in the JOURNAL for Feb. 5, explained the manner adopted for overhauling cars on a 40,000-mile basis. The careful attention given the car equipment accounts in large measure for the results obtained. The plan is well worthy of study. The change in shop organization and standardization of practices along engineering lines is a definite step in the right direction.

Good Maintenance Requires Intelligent Supervision

TAKING too much for granted is a disease easily contracted by those who supervise maintenance work. Many companies make an appropriation for maintenance work either as a definite sum or a per cent of gross revenue and it devolves upon those in charge to spend the appropriation. Some mortgages even specify the per cent of gross revenue that must be spent, leaving the quality of the work performed or its effectiveness undefined.

Obviously expenditures poorly supervised or inefficiently made are economically unsound. Moreover, wasteful methods of maintenance may become evident even to the public. Recently a gang of eight track men were observed slowly walking along one of the tracks of an electric railroad in full view of a morning crowd of commuters. Each man except the foreman was armed with a spiking maul, and as the gang proceeded the spikes that had loosened were driven home again. It does not require a technical education to appreciate the fact that time and money were being wasted by this gang employed in the work generally assigned to one, or two men at the most.

Appearing on the same day in the morning papers was one of a series of articles telling of the progress of a rate case by this same company for an application to increase fares. One of the points brought out at the hearing was that the cost of operation had not declined during the post-war years to the same extent as on other roads. This fact was to some extent substantiated in the minds of those commuters who read and think.

Such an incident, although insignificant and perhaps explainable on good grounds, nevertheless leaves an unfortunate impression that may not be as easily eradicated. Public relations depend on performance, and maintenance is a factor in the establishment of good relations fully as important as any function of the service. The quality of the work will affect the upkeep of the property, but the methods used, especially when exposed to public view, are also important in their psychological effect on the patrons served.

Stop-Loss Bus Operation Merely Begs the Paving Question

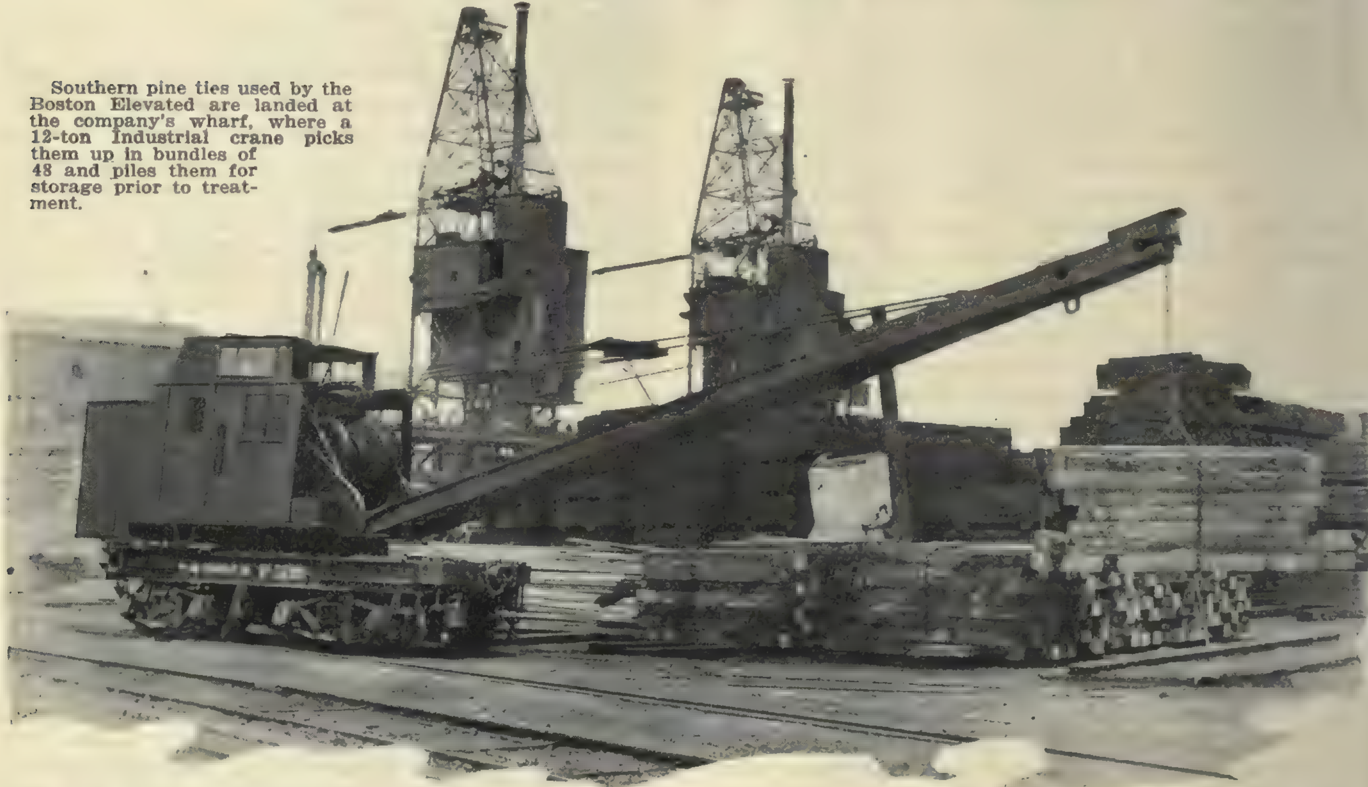
JOY is being expressed by many motorists because the Morris County Traction Company is considering the removal of its tracks from the Newark-Morristown highway and the substitution of bus operation to replace the present car service between Newark and Lake Hopatcong. As soon as the tracks have been taken up it is proposed that the various municipalities through which the line runs replace the worn-out pavement in the track area by smooth new concrete paving.

No doubt such a change would be very agreeable to the motorists, as the present paving is in deplorable condition in many places and the railway is too poor to pay for its replacement. If the municipalities are willing to pay for new concrete paving, as they will have to do if this proposal is carried out, it could be laid just as well with the tracks in place. Last year, however, there was great outcry when the state Senator from Morris County introduced a bill to relieve street railways from their paving obligations. The bill was defeated and the Morris County Traction Company, already in receivership, has had to continue patching pavement worn down by hordes of automobiles and trucks never dreamed of when the obligation was imposed.

A larger question is involved, however, than the mere shifting of the paving burden. Whether or not the bus can provide better transportation than the car on this route appears to have received very little attention. Besides the trackage in paved street, there is considerable mileage on private right-of-way, particularly west of Morristown. In summer the Newark-Morristown-Lake Hopatcong highway carries extremely heavy automobile traffic. Buses certainly could not make as good time under these conditions as do the cars on private way. Before embarking on such a substitution, both the railway and the municipalities would do well to consider experience elsewhere, which has shown clearly that the operation of buses as street cars on rubber tires may serve temporarily as a stop-loss measure, but does not always result in the upbuilding of a satisfactory and prosperous transportation system.

Timber Preservation Saves Money on Boston Elevated System

More than 500,000 Ties Installed Since 1916 on Surface, Subway and Elevated Lines Have Been Treated—Cost Per Tie Per Year Is Estimated to Be 35 Per Cent Less than that of Untreated Ties —Timber for Bridges, Stations, Etc., Also Receives Treatment



Southern pine ties used by the Boston Elevated are landed at the company's wharf, where a 12-ton Industrial crane picks them up in bundles of 48 and piles them for storage prior to treatment.

SINCE 1916 all wood ties used on the surface and rapid transit lines of the Boston Elevated Railway have received preservative treatment before installation. Experience of this company indicates that such treatment practically doubles their useful life. After making allowance for the cost of the treatment, it is estimated that the saving per tie per year is about 35 per cent. Moreover, preservative treatment reduces the original cost of construction by permitting the use of a less expensive grade of timber. Economies have been effected also in the paving account due to less frequent tie renewals. Similar treatment of nearly all other timber used by this company in outdoor construction work has been influential in prolonging its life and reducing maintenance cost.

Experience with treated ties on the Boston Elevated began some 25 or 30 years ago. At that time a preparation called "Woodiline" was used in an open tank. Later a preservative known as "Avenarius Carbolineum" was used. While the results achieved by this method and these products were not perfect, they did impress the management with the value of preservative treatment. In November, 1912, the company commenced the use of creosote pressure-treated ties. These were treated by the Bethel full cell process by a commercial creosoting firm. In the early part of August, 1916, operation of the railway's own plant at South Boston was begun. This is equipped to treat timber by the Rueping empty cell, Bethel full cell or open tank processes.

Treated ties are now used in all track, whether paved or in open construction, and also in subways, tunnels and on the elevated structures. No untreated ties have been used since 1916. An average of about 50,000 ties per year have been installed on the surface lines and about 5,000 per year on the rapid transit lines. Altogether more than 500,000 treated ties have been installed, including those laid in 1926, concerning which exact data are not yet available. Figures by years are given in the following table:

TIES INSTALLED ON BOSTON ELEVATED SYSTEM

	Surface Lines	Rapid Transit Lines
1917	54,000	2,878
1918	22,500	793
1919	81,418	5,079
1920	35,324	5,550
1921	67,782	6,210
1922	63,140	5,902
1923	55,900	4,158
1924	37,284	6,777
1925	31,916	7,210
	449,264	44,557
Average	49,918	4,951

Oak and chestnut ties were used on the surface lines in 1912 and their use continued until the opening of the company's treating plant in 1916. Since then South-

An Average of 50,000 Ties Per Year Used by the Boston Elevated Railway Insures Rapid Movement Through the Timber Treating Plant and Prevents Deterioration Due to Long Storage

ern pine ties have been used except for a brief period during the war when native oak and chestnut were used. Ties on the rapid transit lines have always been hard pine since the opening in 1901. The timber comes from Georgia and Florida by water. Prime grade is used for certain curves on the rapid transit lines, merchantable grade on the remainder of the rapid transit lines and standard on the surface lines.

Hewn ties, 6 in. x 8 in. x 7 ft. 9 in., are used on surface lines except under special trackwork. Sawn ties, 6 in. x 8 in. and 8 ft. to 17 ft. long, are used under special work. On tangent track on the elevated structure ties are sawn 6 in. x 8 in. x 8 ft. 6 in. On the elevated and in the subway under special work ties 7 in. x 8 in., 8 in. x 8 in., 8 in. x 9 in., 8 in. x 10 in., 8 in. x 11 in. and 8 in. x 12 in., ranging from 9 ft. to 17 ft. in length, are used. Bevel ties are used on curves on elevated structures. They vary in size from 6 in. x 8 in. to 7½ in. x 8 in. at the small end and 7⅞ in. x 8 in. to 13¾ in. x 8 in. on the large end. In length they range from 8 ft. 6 in. to 9 ft. 6 in.

Ties and timber are shipped from the South by steamer. After arrival in Boston harbor they are lightered to the railway wharf, where they are landed f.o.b. They are inspected at the wharf and are piled into sling loads. In the case of 7-ft. 9-in. or 8-ft. ties this means 48 ties are picked up by the crane in one lift and landed at the point of piling. With an Industrial 12-ton crane no difficulty is experienced in handling timber of any dimension.

Grade No. 1 A.E.R.E.A. creosote oil is used for treatment. The oil is delivered in tank cars at a nearby siding. These cars are shifted by the elevated to the storage tanks, where the necessary connections are made. A sample from each tank car is submitted to the railway's chemist for analysis before the car is unloaded. His O.K. must be received before the oil is accepted. Storage for 55,000 gal. of preservative material is provided.

The treating cylinder is of 7 ft. 6 in. diameter and 51 ft. long. Up to Dec. 31, 1925, a total of 454,269 ties and 8,027,554 ft. board measure of lumber had been treated. The entire plant represents an investment of approximately $60,000. Upkeep amounts to about $650 a month.

Operating personnel consists of one supervisor, two engineers, one clerk, one foreman and from ten to 25 laborers as required. Of the two engineers, one is the regular plant operator and the other acts as assistant to the supervisor, but is available for plant operation if a double shift is required or when the regular operating engineer is absent.

In addition to inspecting and directing the treatment of all lumber received at the South Boston plant, the supervisor is charged also with the inspection of all lumber received at other locations on the railway. Reports are furnished to other departments so that they can approve invoices. Lumber from razed buildings on the railway's property is sent to the treating plant for inspection, grading and storage. This is used again

Method of Piling Timber for Storage at South Boston Creosoting Plant. Untreated Ties Are Shown at Left and Treated Ties at Right for purposes to which it is suited, thereby effecting substantial economies.

Hewn ties for the surface lines are adzed before treatment. For this purpose a Greenlee adzing machine has been mounted on an old car which can be moved from point to point. This arrangement has been found to be much more convenient than having the machine in a fixed position. A friction feed on the receiving side allows the ties to be carried to the knives and then dropped to a skid on the leaving side, thence to the treating trucks, with a minimum amount of hand labor. Timber and ties used on the elevated structure are framed at the sawmill after treatment. Certain framing has to be done on the job to fit rivet heads, buckle plates, etc., but in all cases framing done after treatment is protected by a brush coat of creosote. The same precaution is taken after boring holes for bolts, lag screws, etc.

UNIT PILING SYSTEM USED

Before treatment ties are piled according to the one by ten plan, with 224 ties in each bay. Four bays with 896 ties comprise one pile. Four more ties are stored on top to make an even 900 in each pile. The piles are 30 in. apart, allowing proper air seasoning. Illustrations on the preceding page show clearly the methods of piling used for untreated and treated ties.

Treated ties are stored in the open, each lift being two by 40 with five lifts in each bay. The length of the bay depends on the storage area available. As the treated ties move rapidly out of storage, no difficulty is experienced in keeping them in first-class condition. Another advantage of this method of storage is that it follows the principle of unit piling for accounting purposes. When loading ties with a locomotive crane it is easy for the crane helper to force a bar between the bays and drop a chain through, making it possible to pick up 40 ties at one hoist. It has been found necessary to provide employees at the treating plant with cheap canvas gloves to protect their hands. Tie tongs were tried, but did not prove satisfactory. Employees installing freshly treated ties are also provided with gloves.

A gang paving block cutter was installed at the South Boston treating plant in October, 1917. The railway now manufactures its own paving blocks of hard pine, 3 in. x 8 in. and 4 in. x 8 in. This machine makes seven blocks at each cut. The only hand work necessary is to feed timber into the machine. Cut blocks drop into a chute and then go to the treating cages. Sawdust is diverted into a separate chute and lands in a bin where it can be reclaimed.

Dating nails are installed in all ties sent direct to the job from the treating plant. Nails are furnished to division offices which supply ties from other storage points. Ties are shipped to the job in steel dump cars holding 300. For small jobs motor dump trucks holding 60 to 70 ties are used.

As the result of its experience the company estimates the life of untreated ties in pavement without concrete base to be about twelve years and in open track from eight to ten years. It is estimated that treated ties laid in pavement will last at least twenty years and in open track at least fifteen years, although often the useful life of the tie is far in excess of these figures.

Cost of ties varies with the market. Sawn ties cost approximately 26 cents more than hewn ties. At the present time, considering wages, cost of material, etc., the total cost of treating a 6-in. x 8-in. x 8-ft. tie amounts to about 50 cents, of which 21 cents is the cost of handling and 29 cents the cost of treatment. The cost of treatment per cubic foot of timber under present conditions amounts to 11 cents. Based on the first cost per tie of $1.75 and a life of twenty years the cost per treated tie per year would be 8.7 cents. For untreated ties at $1.25 each the cost per year is 13.3 cents. Thus preservative treatment reduces tie cost approximately 35 per cent.

A cheaper grade of timber is now being used by the Boston Elevated for ties and on the elevated structure. Previously it was considered necessary to use only hard timber of first quality. Today standard or merchantable grade timber is used. For surface line tracks in pavement or in the open, the same quality is used. A grade cheaper than merchantable of hard wood, such as beech, birch or maple, may be used if obtainable. Actually the company has found it practically impossible to obtain any hard woods of this description.

No offsetting disadvantages connected with the use of treated ties have been experienced by the Boston Elevated. No difficulties have been experienced with the spikes nor has there been any serious cutting of the ties at the base of the rail. In fact, it is thought that this has been less than with untreated ties.

It has been found that the use of preservative treatment of timber for purposes other than ties on the rapid transit lines increases its life due to a reduction in mechanical wear such as checking or splitting. All timber used for bridge stringers, guard rails, footwalks, cable boxes and miscellaneous purposes on the elevated structures, crossarms, fence posts, pickets, station floor stringers, wharf repairs, piling, block paving, etc., is now being treated before installation. The company is thoroughly convinced that this practice extends its life and lowers maintenance cost.

Wheel Fenders Protect Trucks

FOR the purposes of protecting the electrical equipment and keeping its new cars as clean as possible, the Porto Rico Railway, Light & Power Company, San Juan, P. R., is installing fenders on all trucks for its six new cars now being assembled. The frames for these fenders are made up of ½-in. x 1-in. angles bent in semi-circular form and securely bolted to the truck frame. Sheet iron is riveted to the angles, and this has sufficient stiffness to support itself so that no angle is necessary on the inner side of the car wheels.

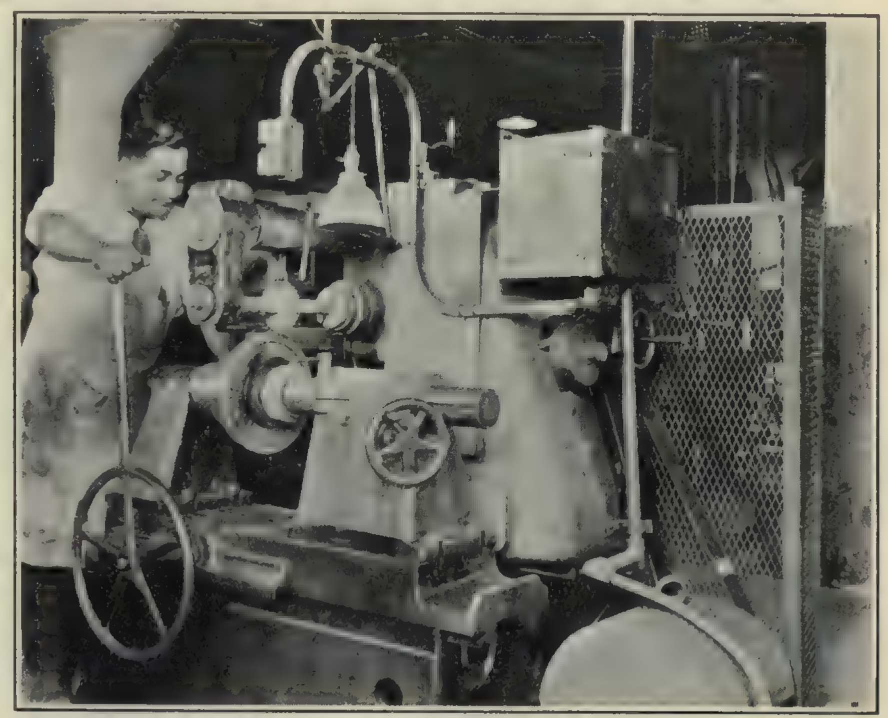
Sheet Iron Fenders Placed Over the Car Wheels Keep Mud and Dirt Off Equipment in San Juan, P. R.

The illustration shows these fenders mounted on one of the trucks. Their use keeps mud and dirt off the equipment and so assists in maintenance of the cars.

Soldering of Railway Motor Commutators*

Satisfactory Methods for Removing the Leads from the Necks of Commutators Preparatory to Rewinding Are Given and Soldering Operations Are Described—Pot Dipping Best When a Large Number of Armatures Are to Be Soldered

By Jesse M. Zimmerman
Renewal Parts Engineering, Westinghouse Electric & Manufacturing Company



Slotting a Westinghouse Type 12-A Commutator Neck

BOTTOM leads of practically all armatures wound with wire coils, and a large proportion of these with single-loop strap coils, may come straight to the commutator necks. With this arrangement it is not necessary to use a filler between the top and bottom leads. However, in order to make a double-loop coil of ribbon wire or insulated strap, which can be wound without forming the bottom leads during the winding operation, it is necessary to bring the leads to the commutator neck at an angle of approximately 45 deg. with respect to the top lead, as shown in an accompanying diagram. A triangular filler must then be placed between the top and bottom leads to take up the space. This filler is kept from sliding back in the slot by bending its front end, *D*, to one side. After the leads are soldered the end of the filler is machined off.

All drifting should be done on the filler in the top of the commutator slot and not directly on the leads. This avoids the nicking of the copper. Swedging of the leads also should be avoided. The bottom lead should lie in the bottom of the slot in the front of the neck only; at the rear of the neck a clearance of $\frac{1}{8}$ in. should be left. This is accomplished by making the rear of the slot at least $\frac{1}{8}$ in. deeper than necessary to contain the armature leads. The rear mica V-ring should be built up with treated cloth tape $\frac{1}{16}$ in. above the bottom of the slot. When the leads are placed in the slot the tape will compress sufficiently to provide a good solid pad for the leads to rest on, thus decreasing the vibration and eliminating the possibility of nicking the bottom lead. Some operators have found it desirable to make a ring of wood to place over the rear V-ring back of the commutator neck to support the leads instead of using treated cloth tape.

In figuring the depth of a commutator slot, two rules are used, one being for the front slot depth and the other for the rear slot depth. The front slot is made the depth of the conductors plus the front depth of the triangular filler between top and bottom leads, if one is used, plus the filler in the top of the slot. The rear slot depth is the depth of the conductors plus the rear depth of the triangular filler between top and bottom leads, plus the filler in the top of the slot, plus $\frac{1}{8}$ in. between the bottom of the slot and the bottom lead.

On some types of armatures it has been found necessary to strengthen the leads where they leave the commutator slot, by placing a phosphor bronze sleeve over them. This sleeve supports the leads back of the commutator, eliminating broken leads. The use of these sleeves is confined to ribbon and small strap coils. The thickness of the phosphor bronze sleeve must be added to the depth of the conductors when figuring the slot depth.

It is best to place a filler in the top of the commutator slot. All drifting should be done on this filler and in the front part of the slot, and not directly on the leads. It can be made from the cut-off ends of the conductor. However, in figuring the slot depth $\frac{1}{8}$ in. should be the maximum amount to be allowed for the top filler.

Sufficient clearance should be left between the conductor and the side of the slot that the leads may be driven home without crowding and to permit ample room for the solder. In figuring the slot width 0.005 in. is usually added to the width of the conductor for wire coils, and from 0.010 in. to 0.015 in. is added to the width of strap conductors. Whenever a phosphor bronze sleeve is used over the armature lead the allowance should be added to the width of the sleeve and not to the lead.

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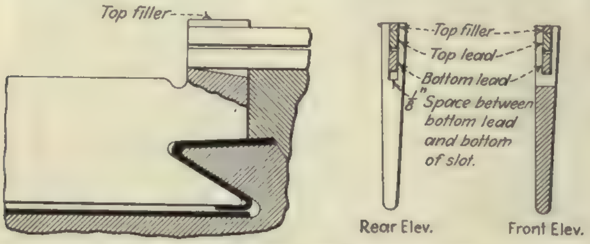
*This is the sixth of a series of articles on commutators appearing in ELECTRIC RAILWAY JOURNAL. The others were "Choosing Materials for Railway Motor Commutator," published Aug. 2, 1926; "Important Considerations in Replacing Commutator Bars," published Oct. 23; "Accurate Machining of the V's of Assembled Commutators Is Essential," published Nov. 20; "Mica V-Rings and Bushings Have Important Functions in Commutators," published Dec. 18, and "Methods and Equipment for Efficient Assembling of Commutators," published Jan. 15, 1927.

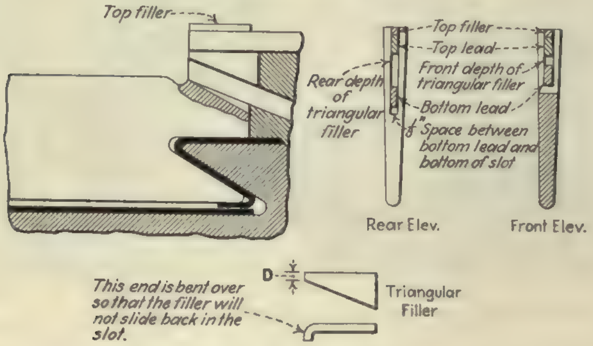
REMOVING LEADS FROM COMMUTATOR NECK

Removing the leads from the soldered commutator neck can be accomplished in four ways, namely, drifting the leads out cold; drifting after softening the solder; breaking the solder with a splitting tool, and remilling the slot. Some repairmen drift the leads from the slot with a gouge without heating the solder. This apparently works out very satisfactorily, though care must be taken so as not to break the side of the neck.

To soften the solder the commutator neck should be heated, preferably with a hot soldering iron. With a torch the commutator neck should not be heated too long at one spot as it will tend to anneal the copper. When the solder has softened the leads can be removed from the slot with a gouge. After the conductors have been removed the soft solder which remains in the slot should be blown out with compressed air. This method can be used to good advantage where the conductors are very small.



Standard Slotting for Commutators

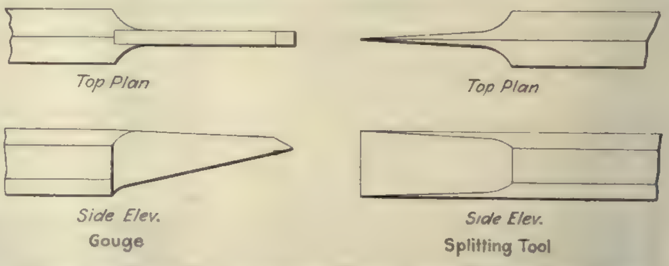

Top filler
Top filler
Top lead
Front depth of triangular filler
Rear depth of triangular filler
Bottom lead
1/8" Space between bottom lead and bottom of slot
Rear Elev.
Front Elev.
This end is bent over so that the filler will not slide back in the slot.
D
Triangular Filler

Commutator Slotted for Special Triangular Filler

The splitting tool used for removing conductors is a chisel which has a wide thin blade. This is driven between the conductor and the side of the slot to break the solder holding it. It must be driven on each side of the conductor, which then can be lifted by the gouge. After the conductors are removed from the first slot the necks will bend over slightly, giving sufficient room to make the operation easy. This method does not work as well as the previous ones in removing small wire. After the leads have been removed the sides of the slot should be cleaned with a thick hacksaw blade or a thin flat file.

If equipment is available to reslot the commutator bars it is convenient to cut off the armature leads behind the neck in a lathe or with a hacksaw and reslot the commutator. This leaves a clean slot in which it is easier to solder the leads. After the commutator neck has been remilled the slots should be coated with a flux of 1½ lb. of resin mixed with a quart of denatured alcohol. This prevents the copper from corroding.

Before discussing the soldering of armature leads it is well to analyze the different types of solder which are available. There are three important phases to consider, namely, cost, ease of working, and ability to hold the metals being soldered. The two first are closely related. The soldering material may be low in first cost, yet if it does not work easily the excess labor which is required will make the total cost of the soldering very high. Cheap solder always contains a large proportion of lead and is difficult to work. In selecting a solder it is necessary to consider the maximum operating temperature of the commutator, as it must withstand this temperature without softening. An accompanying graph shows the melting points of different mixtures of tin and lead solder.

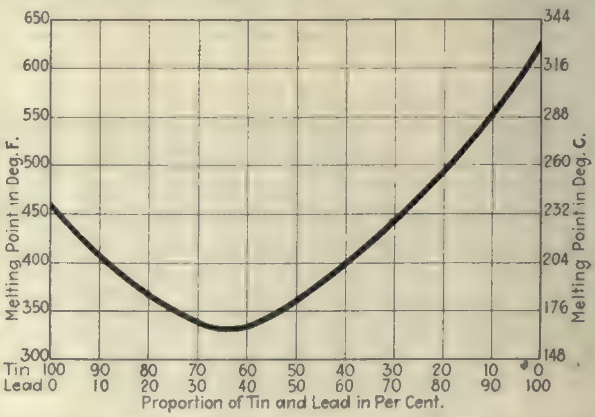


Tools for Removing Armature Leads from Commutator Slots

Solder made from half lead and half tin has a melting point of 181 deg. C. It flows readily and holds the metal firmly as long as the commutator temperature does not become excessive. Besides, it is reasonable in price. Its application is limited mostly to wire-wound armatures.

Pure lead solder has a melting point of 325 deg. C. Although cheaper than half and half solder and having a higher melting point than pure tin it cannot be worked easily. Any solder which has a large proportion of lead is so hard to handle that it is difficult to obtain a good job. Therefore it should not be used.

Where the operating temperatures of the commutator are high pure tin solder should be used. It has a high melting point, 230 deg. C., and when molten it flows easily and rapidly. It tends to spread beyond the surface being soldered, so a skilled workman is needed to handle it properly. The use of pure tin solder is confined to strap and ribbon coils because the clearances between the conductors and the slot are so small that it is necessary to use a very fluid solder. Armatures wound with wire conductors which are worked at high temperatures should be soldered with 85 per cent tin and 15 per cent lead. Extreme care should be taken



Temperature Curve Showing Melting Point of Tin-Lead Solder

when using pure tin solder on commutators wound with wire coils in order to prevent it from running through the slot, forming a short circuit back of the commutator.

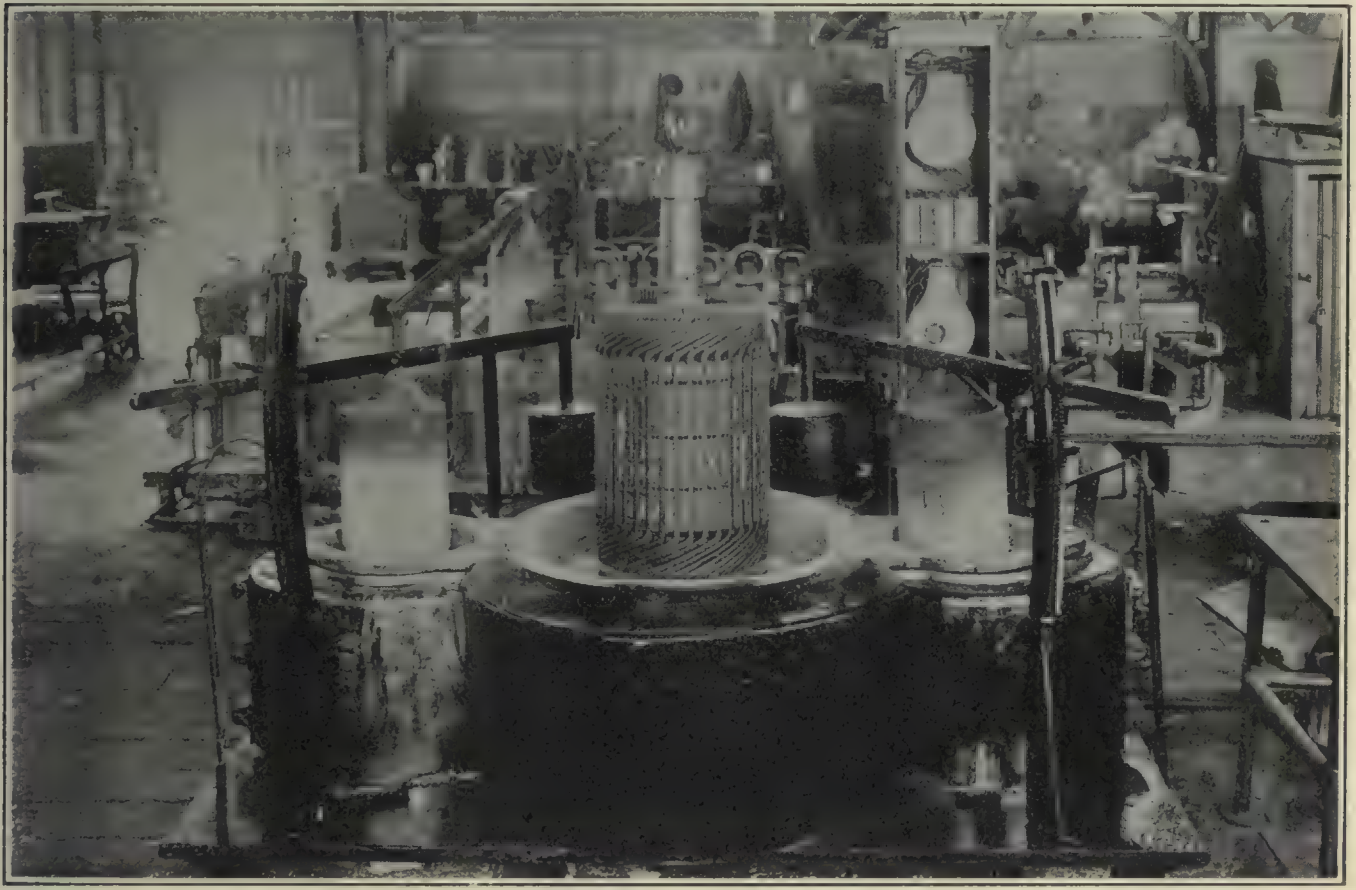
When the commutator is overheated for too long a time while soldering the pure tin will eat its way into the copper parts. It is therefore necessary to watch the temperature and length of time required for the soldering operation when using pure tin.

As soon as the solder begins to soften and throw when the armature is in operation the trouble is usually laid to high commutator temperature. The softening is due to a high temperature of the commutator neck, but not always to high commutator temperature. It is the tendency in some repair shops to take a heavy cut off the front of the commutator neck after the leads have been soldered. This makes the neck narrower, thus cutting down the contact surface. Since in a railway motor each soldered connection in the neck must carry half of the armature current it can readily be seen that if the contact surface is decreased materially the necks will overheat. After the leads have been soldered the machining should remove only the extended leads and as little of the commutator neck as possible.

Flux is a compound which is used to make the solder take hold of the metal. It prevents the formation on the metal surfaces of thin coatings of oxide which hinder the solder from covering the entire surface of the two parts being soldered. It is important to make sure that the flux does not contain acid, as it will destroy the insulation on the armature coil, thus causing a short. An inexpensive flux which will not affect the insulating material can be made by mixing 1½ lb. of resin in a quart of denatured alcohol. It is easier to apply flux in a liquid form.

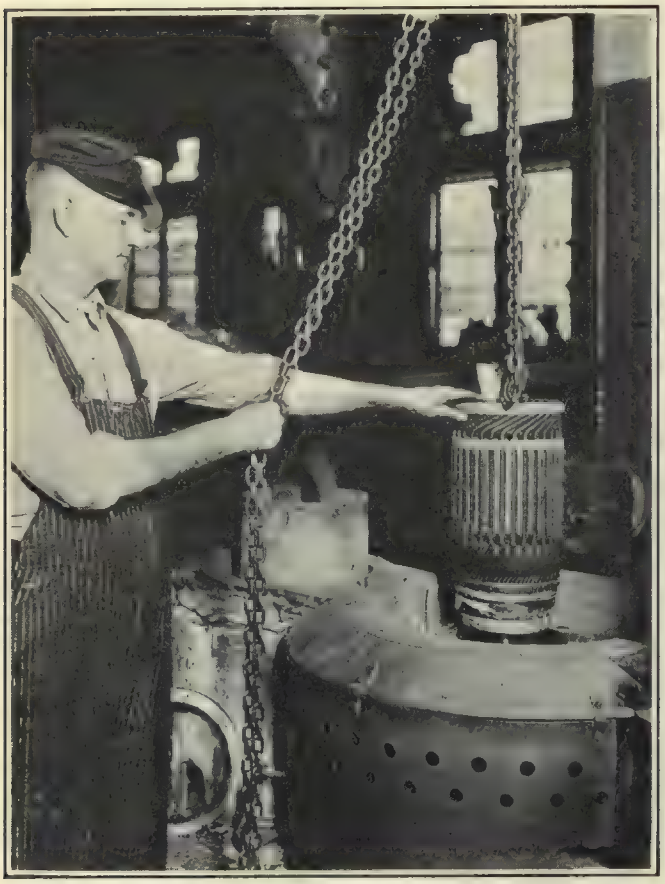
It is not necessary to tin the slots before soldering an armature, if the slots are painted properly with a liquid flux immediately after slotting and the armature leads are tinned well. If the commutator slots are dirty, they can be cleaned with either a heavy hacksaw or a thin file. A few repairmen feel that it is desirable to tin the slots of commutators using strap coils. An investigation has shown that no real benefit has been obtained if the slots are clean and leads properly tinned.

Soldering in the average repair shop is usually done by hand. However, if a large number of armatures are to be soldered, a soldering pot is the most efficient method. Before undertaking to solder the commutator the leads should be tinned well, the slots should be perfectly clean and a coat of flux applied.



Complete Soldering Pot Showing Thermostatic Control

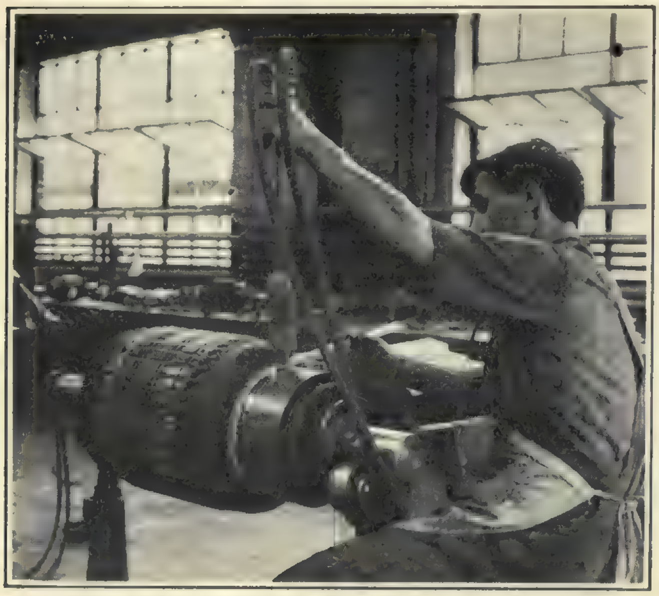
In the illustration, an armature is shown in a soldering pot. The center compartment has an opening large enough to fit the largest commutator. For smaller commutators, rings are used which will fit over the face. The opening between the commutator face and the hole in the ring is closed by wrapping the commutator face with several turns of asbestos rope. This prevents the solder from flowing out of the compartment along the commutator face. The two side pots contain molten solder which is forced into the center pot around the neck of the commutator by lowering the plungers. This solders all the leads at one time, thereby eliminating the danger of overheating the commutator neck. The level of the solder is brought up to the same height as the rear of the commutator neck. With this method the solder cannot work back of the commutator neck



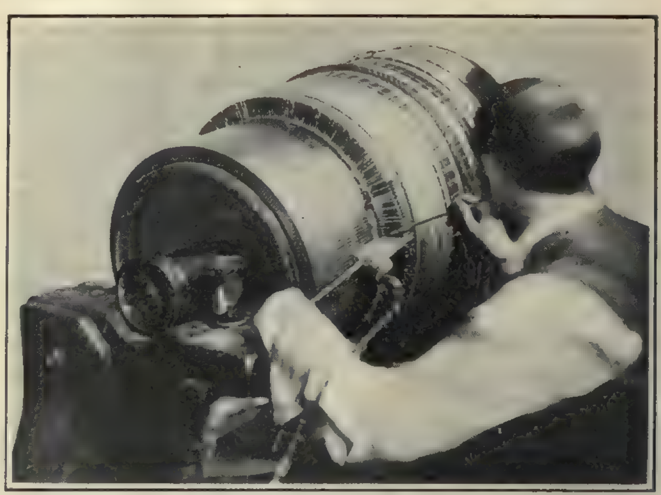
Dipping Armature to Solder Leads

and thus cause a short circuit. After the commutator neck has been immersed for a short time the solder is drained from the center compartment by lifting the plunger. The use of a pot simplifies soldering wire-wound armatures with the 85 per cent tin and 15 per cent lead solder.

In order to prevent short circuits back of the commutator neck, it is necessary to raise the pinion end of the armature high enough that the rear of the slot will be slightly above the front of the slot. This will cause the excess solder to flow to the front of the slot. The soldering can be done either at the top of the commutator or at the side. It is found that by soldering on the side, short circuits back of the commutator are not so likely to occur. By eliminating the possibility of these shorts the repairman will not be afraid to heat the neck so that the solder will cover the entire surface.



Soldering an Armature at the Top with a Self-Heated Iron



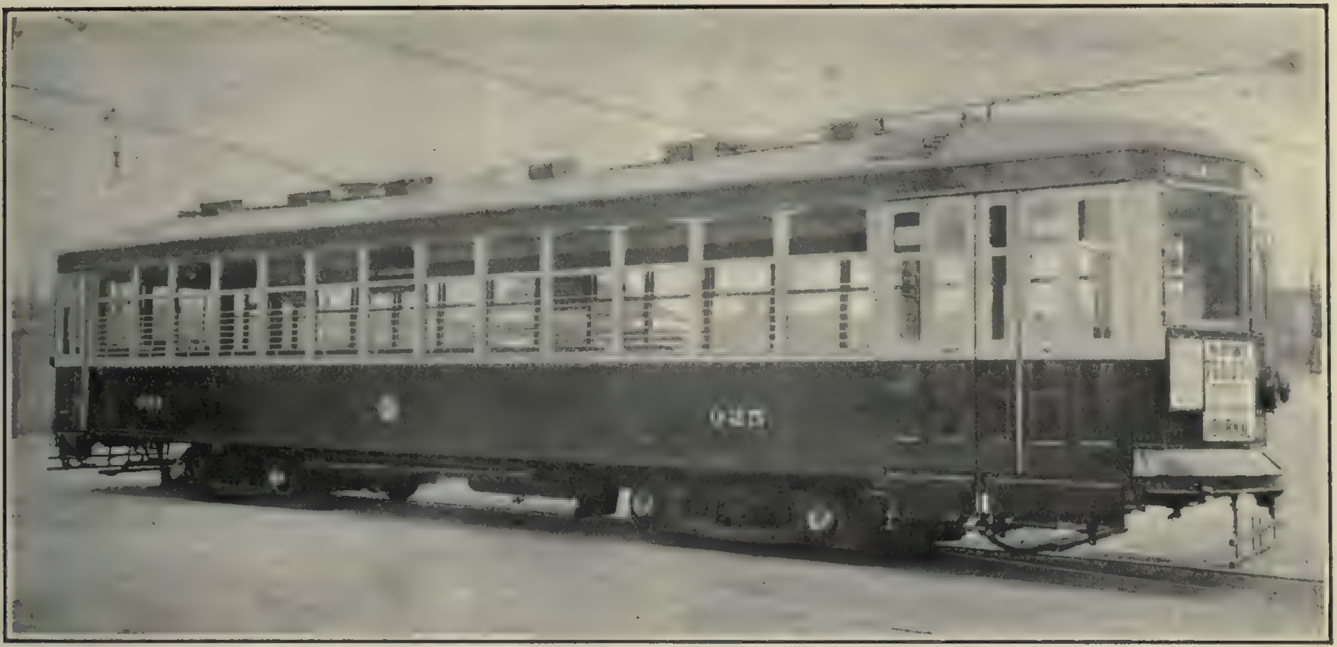
Soldering a Commutator at the Side. The Soldering Iron Is Supported by a Special Rest

Hand soldering is usually done with a copper tool heated in a gas flame. Self-heating gas or electric "irons" are often used but are not as popular as those heated in a gas flame. The irons usually weigh from 2 to 3 lb. Heavy irons will hold the heat longer, which is desirable. However, when heavy irons are used for side soldering there should be a support for the iron to rest upon. This will relieve the workman of the strain of holding the iron during the soldering operation.

Tinning of the iron is very important. When soldering is done on the top of the commutator the whole point of the iron should be well tinned. If the soldering is to be done on the side of the armature with pure tin solder the part of the iron which strikes the copper bar should be clean and tinned perfectly. The lower side of the iron should not be tinned because the molten solder will flow along the bottom of the iron and drop off instead of flowing into the slot.

When soldering large commutators it has been found convenient to apply a gas flame on the iron during the soldering because the leads and core of the large armature will radiate heat from the iron very rapidly. The commutator face should be wrapped with asbestos cloth. The nozzle of the torch is pointed to the front of the commutator and adjusted so that the flame will strike the flat side of the iron.

Before hand soldering, large commutators should be preheated. This is done most conveniently by heating the whole armature in an oven. If an oven is not available the commutator can be heated by rotating the armature while exposing the commutator face to the gas flame. Some armature winders when soldering commutators have a small gas flame strike the commutator face in front of the commutator neck just ahead of the soldering iron. This is bad practice because it is very difficult to adjust the flame so that it will not overheat the commutator face in spots, annealing the copper and causing the commutator face to wear unevenly. The same result can be obtained by making a small electric pad or heater which can be placed against the commutator face to preheat the bars before they are soldered.



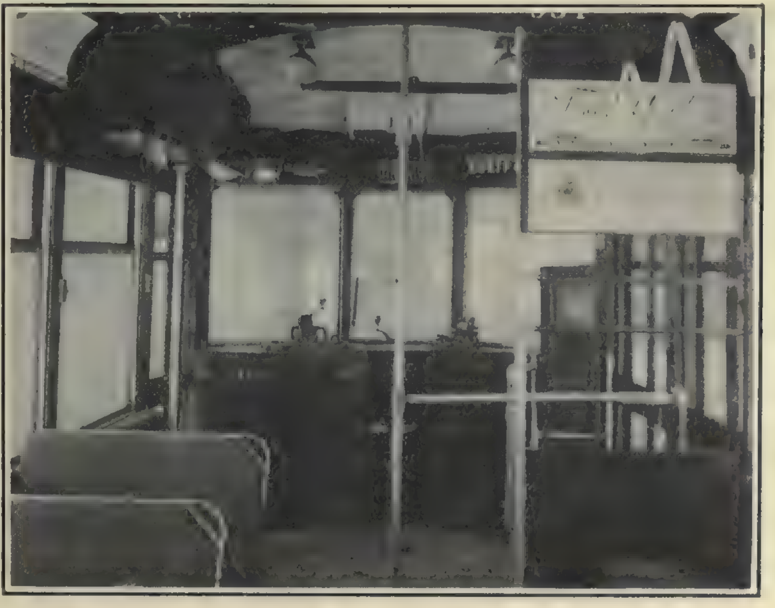
One of 40 New One-Man Cars Built for the Milwaukee Electric Railway & Light Company in the Short Time of 3½ Months. Reduced Width of the Rear Door Gives the Car an Appearance of Added Length

New Cars Selected in Preference to Rebuilding

The Milwaukee Electric Railway & Light Company Has Just Bought 40 New One-Man Cars, Believing that the Operating Economies Possible Will Pay Better than the Rehabilitation of Old Equipment that Later Would Have to Be Discarded

NOTEWORTHY in street railway annals is the recent purchase, building, delivery and assignment to duty on the lines of the Milwaukee Electric Railway & Light Company of 40 one-man cars. This was completed eleven months prior to the date set by the Railroad Commission in an order directing the company to install additional equipment. It is also an illustration of successful co-operation on the part of the car builder in an emergency so that improved city service could be rendered within the shortest possible time. Although the cars were ordered only on Sept. 4, all were in operation by Dec. 30. This is said to set a record in providing street cars in quantity lots.

The first cars arrived on Nov. 22, eight days ahead of the promised delivery date, and the remainder arrived from a few days to more than a week ahead of time. While the building of such a large number of cars requires under ordinary circumstances from six to eight months, in this case the company demanded quick action so that the patrons could have immediate use of the new equipment. The company hopes to effect economies in operation by furnishing the new equipment now instead of providing temporarily rehabilitated equipment that later would have to be discarded in favor of new cars.



A Feature of the Cars Is the Inclosure of the Piping and Wiring

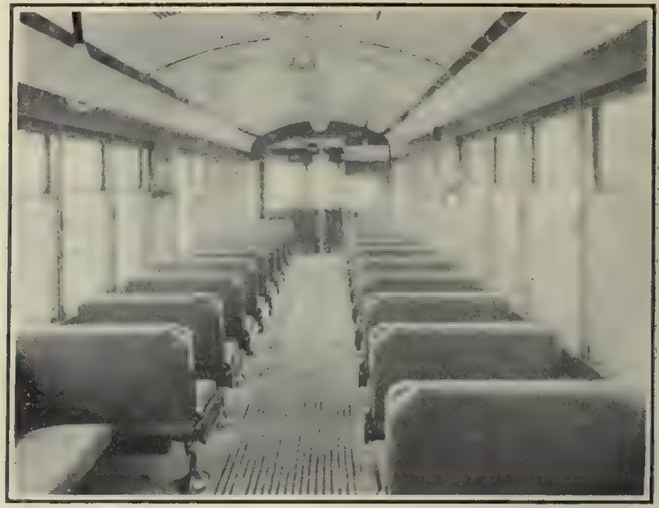
In general appearance and construction the 900 type car, as the new series is known, is much the same as its predecessor, the 800 type one-man car, which was originally designed by the company's engineers. No effort has been spared to enhance the interior and exterior appearance. With a headway that is at least 20 per cent more frequent than the previous one, a substantial increase in street car traffic is looked for. Construction of these new cars was carried out in accordance with plans provided the St. Louis Car Company by the railway company's engineering staff. These included several important changes in design and equipment from previous types. Interior improvements which have a parallel application in automobile construction are more numerous than the exterior changes. This is in accordance with the view that the rider is far more interested in the inside accommodations than in a finely finished exterior which may have been provided at the expense of an attractive and inviting interior.

Unlike the preceding model the new cars are arranged for front entrance only. Elimination of the doors at each end for operation by a conductor has a tendency to make the car appear longer as well as to add to the seating capacity. Only a small exit door, operated by a treadle, remains at the rear, and it has been moved farther back. The change in platform design provides seats for four more passengers and permits the installation of an extra window at each end where there formerly was a door. The new cars have a seating capacity of 55.

A pleasing feature of the new car which attracts the eye of the rider immediately on boarding is the clean-cut appearance. This is largely the result of the introduction of a new control cabinet arrangement. The entire control equipment is incased in brown enameled sheet metal, concealing the compressed air pipes and other devices ordinarily visible on the platform. Besides improving the appearance, this arrangement allows the platform to be cleaned thoroughly, which was impossible with many exposed pipes. Now only two pipes and the foot valve are exposed. This is done to make a recess or opening in the center of the cabinet so that the operator can bend his knees when in a sitting position.

An improvement in the control which was developed as an added precaution against accidents provides an automatic interlocking of the air brakes with the treadle door so that should a passenger stand on the treadle ready to alight and the operator release the air, the brakes would still remain set until the passenger alighted, after which the treadle would unlock the valve.

Another important interior improvement which has attracted much favorable comment is a radical change in the lighting equipment. Instead of the old type 23-watt lamps mounted in sockets on a molding above the seats, six large attractive center fixtures of the semi-direct type are equipped with two 61-watt nonglare lamps each. These units are hung from the center of the ceiling, throwing a much brighter light, but without discomfort to the eyes. This arrangement also increases the clean-cut appearance of the interior. The lighting fixtures were developed by the Milwaukee company. Consequently all overhead lighting equipment was shipped to the builder for installation. Other changes in lighting include the use of two lamps on each platform instead of the customary three. Increased platform illumination is provided, however, by using 61-watt lamps instead of 23-watt.


The Interior Is Attractively Finished in Light Cherry Trim, Set Off by Polished Aluminum Fittings

Aluminum is used for grab handles on the seats and for vertical stanchions, taking the place of brass or white enameled metal. The seat covering is Kemi-suede placed over rattan. Like other interior parts of the car the dark gray seat coverings can be cleaned with soap and water. When worn out they can be replaced quickly with new covering.

A new type signal button has been installed. This is an improvement over the old type because of less difficulty experienced in locating trouble with contacts installed inside the posts. With the entire button mechanism outside the posts little difficulty is had in examining and repairing them.

An electric heater is placed below each seat. The temperature is automatically regulated by a thermostat. Curtains are the National Lock Washer type covered with double-faced Pantasote. Two rear-view mirrors are on each platform, one directly above the operator's head and the other in the front left-hand corner. During daylight hours the operator can watch the treadle door

GENERAL SPECIFICATIONS OF MILWAUKEE ONE-MAN CARS

Weight, total	33,200 lb.
Bolster centers, length	20 ft. 9 in.
Length over all	45 ft. 0 in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 7⅝ in.
Height, rail to trolley base	11 ft. 4 in.
Body	Steel, wood roof
Interior trim	Cherry
Headlining	Agasote
Roof	Arch
Air brakes	Safety Car Devices Co.
Armature bearings	Plain
Axles	Heat treated carbon steel
Bumpers	Channel
Car signal system	High voltage
Car trimmings	Bronze
Center and side bearings	Oil lubricated center, plain side
Compressors	DH16
Conduits and junction boxes	Steel
Control	K-35 JJ
Curtain fixtures	National Lock Washers, spring plug
Curtain material	Double faced Pantasote
Destination signs	St. Louis
Door-operating mechanism	National Pneumatic treadle rear exit and T. M., E. R. & L. Co. standard
Energy saving device	Economy meter
Fare boxes	T. M. E. R. & L. Co.
Wheelguards	T. M. E. R. & L. Co. standard
Gears and pinions	Grade M, 30 sets Grade B non-resonant, 10 sets
Heater equipment	Railway Utility
Headlights	O. B. Golden Ray Reflector
Journal bearings	Plain
Journal boxes	St. Louis
Lightning arresters	M-D
Motors	Four GE-264-A, inside hung
Paint	Glidden railway enamel, 20 cars; R. F. Johnston railway enamel, 20 cars
Safety devices	Safety Car Devices Co.
Sanders	St. Louis air operated
Sash fixtures	Edwards wedge lock
Seats	St. Louis
Seating material	Kemi-suede over rattan
Slack adjuster	Non-automatic turnbuckle
Springs	Elliptic bolster and coil for equalizers
Step treads	Kass
Trolley catchers	Ideal
Trolley base	U. S. 13-E
Trolley wheels	6-in. diameter
Trucks	St. Louis E1, B64
Ventilators	Peerless
Wheels	Steel, 26-in.

with either mirror. At night when the back curtain is brought into use the center mirror is obscured and observation of the rear is accomplished by means of the extra side mirror. All switches are centralized and inclosed in two cabinets, one on each platform. These are finished in a light cherry stain which lends attractiveness to the interior.

A new type of truck has been introduced which possesses better spring suspension and easier riding qualities. For propulsion four GE-264-A motors are used, together with St. Louis E-1 B-64 cast steel trucks with equalizing springs and auxiliary light-load bolster springs.

The Milwaukee company painted these cars in a special color scheme so that they can be distinguished readily from others on the system by waiting passengers. With the entrance at the front this is quite desirable. The new cars are finished in deep orange on the side panels up to the belt rail and on the letterboard. Sash rests and window posts are ivory and the bands of color are carried across the doors and around the ends of the car to give a streamline effect. The interior is also pleasingly bright, being cheerfully finished with light cherry wood trim that is set off by the polished aluminum fittings.

Screened Refuse Car

CONSIDERABLE trouble having been experienced by the York Railways, York, Pa., from the blowing about of light refuse material during its transportation from the shop to its disposal point, E. L. Greene, master mechanic, designed and constructed a refuse car to obviate this objectionable feature. This car is a single-truck trailer, with heavy yellow-pine underframing, braced and reinforced by cross and vertical oak timbers, all being securely bolted together. It is of semi-closed construction, the closed portion extending above the floor about 3 ft. and the remainder being screened by a wire screen having about ½ in. mesh.

The solid and screened portions of the sides of the car are divided into sections and heavily hinged to permit the opening of the entire side, thus facilitating loading and unloading. Heretofore refuse material was deposited in an open bin in the vicinity of the shop, then loaded and transported on open cars or trucks to the refuse dump. With a reasonably strong wind blowing or the car running at a fair rate of speed considerable of the light refuse was blown to the street.

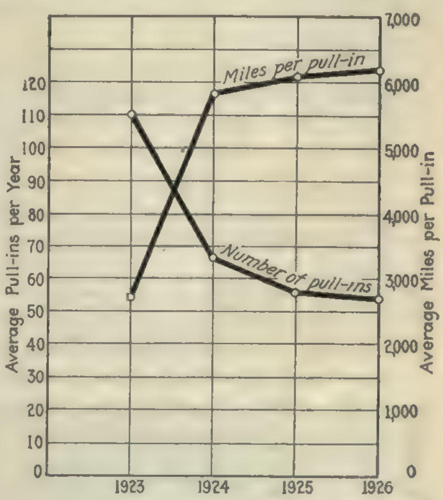
Now all refuse is deposited directly in the car, thus saving double handling and eliminating the disagreeable feature of light particles being blown to the surrounding highways during transportation.

Refuse Car Has Hinged Section of Solid and Screened Parts

Maintenance Cost Reduced at Harrisburg

Introduction of Rigid Inspection System, Making Minor Repairs on the Road, Not Filling Vacated Positions Has Improved Operation and Effected a Substantial Saving

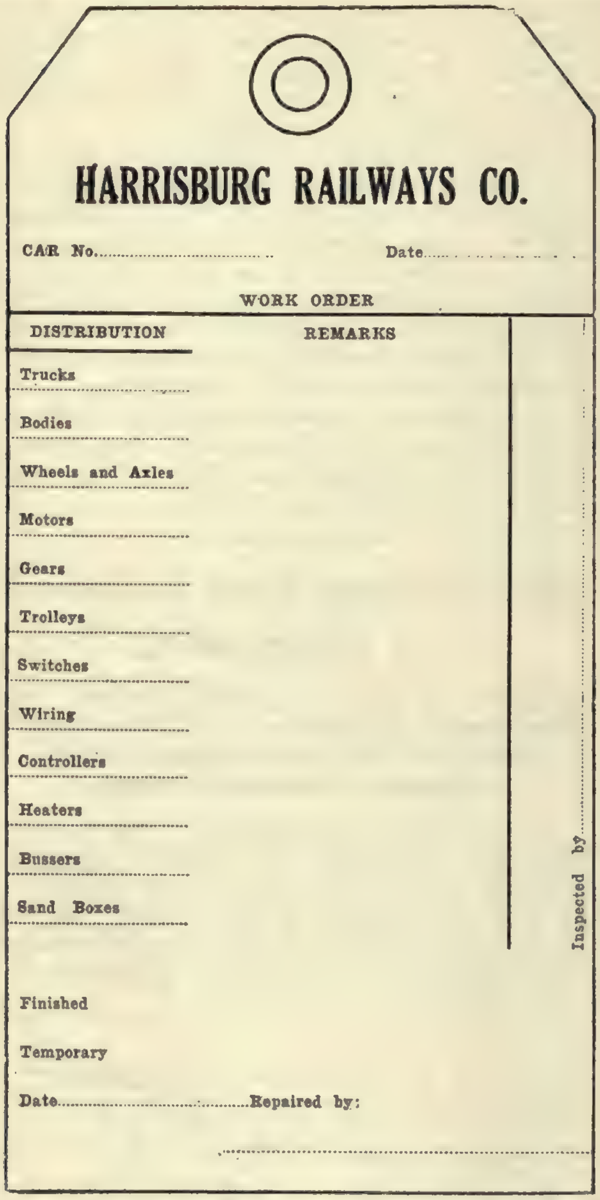
EARLY in 1924 the management of the Harrisburg Railways, Harrisburg, Pa., initiated an intensive analytical study of the methods and practices followed in the maintenance of the company's car equipments for the purpose of determining wherein maintenance costs and car defects could be decreased. All departments and sections of departments were investigated carefully as regards the work being performed, the method of accomplishment and speed of production. This resulted in several changes being made in the centralization of production and shop practices and which had an extremely beneficial effect in the reduction of maintenance costs. The four outstanding changes consisted of:



Graphs Showing Decrease in Pull-ins and Increase in Mileage per Pull-in of the Harrisburg Railways. (The Last Three Months of 1926 Are Estimated)

1. Introduction of a more rigid inspection system and means of placing responsibility.
2. Making all minor equipment failure repairs at Market Square.
3. Discarding oil rear lamps and substitution of electric.
4. Leaving labor vacancies unfilled where possible.

It had been the practice for the inspection organization to make inspections and repairs and return the



HARRISBURG RAILWAYS CO.

CAR No.. Date..............................

WORK ORDER

DISTRIBUTION	REMARKS
Trucks	
Bodies	
Wheels and Axles	
Motors	
Gears	
Trolleys	
Switches	
Wiring	
Controllers	
Heaters	
Buzzers	
Sand Boxes	

Inspected by..............................

Finished

Temporary

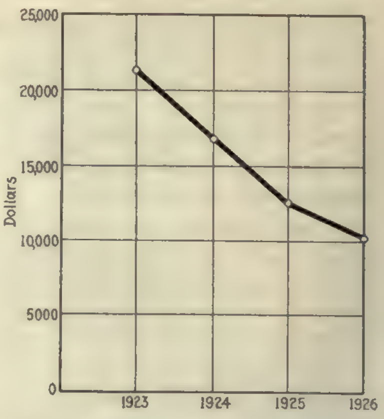
Date..Repaired by:

....

Adoption of this Inspection Tag by Harrisburg Railways Has Resulted in a Better Analysis of Maintenance Costs

car to service without completely recording the findings of the inspection or the nature of the repairs. As a result when a road failure of the equipment developed it was very difficult to obtain sufficient history of the defective piece of apparatus to place the responsibility accurately. To obviate this condition an inspection tag was designed covering all inspection operations which is attached to the car upon its arrival in the shop for inspection. The inspectors are required to note on this card the condition of the various parts of the equipment together with the nature of the repairs made. This tag, bearing the signature of the inspector is filed in the master mechanic's office and provides a permanent record of the inspection, repairs and responsibility for every car going through the inspection process. This tag has been the means of creating a feeling of responsibility among the inspectors and has resulted in more efficient and satisfactory work being performed, with a marked reduction in road failures.

The physical layout of the system with regard to the main traffic arteries is such that if the transportation crews were required to return defective cars to the carhouses serious service interruptions would occur. It had therefore been the practice to utilize two carhouse men for the replacement of a defective car with a good operating one. This replacement generally took place at Market Square, which is the terminal for all lines. As a result of this method the services of these two men for shop production purposes were lost during the greater part of the working day.



Electrical Maintenance Costs Have Decreased Each Year Since the Adoption of the New Method. (The Last Three Months of 1926 Are Estimated)

A careful check of the road failures showed that 95 per cent of them were of a very minor nature and could have been repaired on the road, saving the shifting expense. Therefore a capable man was placed in Market Square, whose duties were to make all repairs possible without interrupting service, and the services of the shifting crew were dispensed with. This change has been the means of reducing greatly the pull-ins and labor expense for maintenance, as well as obtaining appreciation from the operating men and the public.

SUMMARY OF AVERAGE PULL-INS PER YEAR, AVERAGE MILEAGE PER PULL-IN AND ELECTRICAL MAINTENANCE LABOR COST ,HARRISBURG RAILWAYS

Year	Pull-ins Average per Year	Average Mileage per Pull-in	Electrical Maintenance Labor Cost per Year
1923..............	110	2,700	$21,322.62
1924..............	66	5,773	16,805.86
1925..............	56	6,044	12,518.18
1926..............	54	6,220	11,204.48
(Nine months actual)			
(Three months estimated)			

Basic schedule.............................. 50 cars
Peak schedule.............................. 90 cars

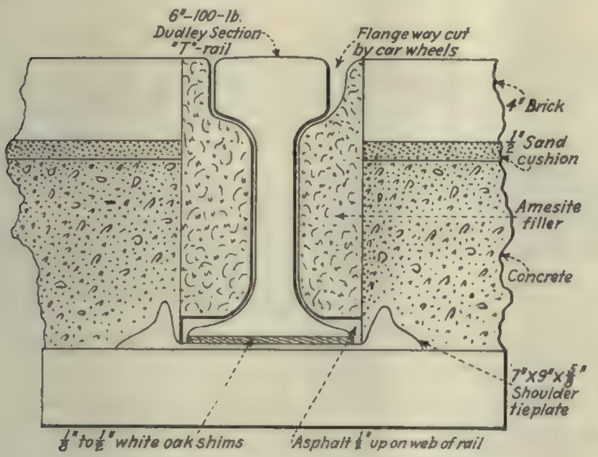
Rear end protection by means of oil lamps was found to be very expensive from a maintenance point of view, since it required the continuous services of two men to gather, distribute and trim these lamps. A careful balance of the cost of a new electric rear end lamp installation and its maintenance against that of the oil light system showed that the cost of the new installation could soon be paid for by the saving effected in maintenance. As a result all cars were equipped with electric rear lamps. As the work progressed the oil lamp maintenance gang was decreased until the maximum of saving in maintenance was procured.

Where possible, vacancies caused by dismissal or resignation have not been filled. A part of the wages saved is utilized in salary increases for the remaining men and the balance is credited against maintenance saving. These increases have been received by the men with great appreciation and have acted as a stimulus for greater effort. As a result the production has not been reduced due to the loss of man power.

Adoption of numerous changes in methods and procedure throughout the shop, especially those enumerated above, has been a means of reducing the electrical maintenance labor costs 47 per cent and increasing the average mileage per pull-in 230 per cent.

Correcting Rail Alignment and Repaving

EARLY in 1913 new rails were laid by the Erie Railways, Erie, Pa., on State Street between Sixth and Fourteenth Streets. A standard 6-in. steel rail weighing 100 lb. was laid on wood ties with steel shoulder tie plates and screw spikes, all being imbedded in solid concrete. This rigid construction, together with the heavy traffic, finally caused rail joint flexion which radiated the entire length of the rail. This resulted in wear on spikes and tie plates and a general loosening of the rails.


6"-100-lb. Dudley Section "T"-rail
Flange way cut by car wheels
4" Brick
½" Sand cushion
Amesite filler
Concrete
7"x9"x⅝" Shoulder tieplate
⅛" to ½" white oak shims
Asphalt ½" up on web of rail

Sketch Showing Method for Shimming Rails, Installing Paving and Applying Filler

This condition was discovered in the spring of 1926. It was found that the rails were very loose in some places and would require immediate attention. A careful examination and calibration of the rail and the pavement away from the rail showed both to be in such good condition that a new construction job was not warranted. Various schemes were considered for the realignment and tightening of these rails. A method was finally adopted which after eight months service has been found satisfactory.

The pavement was opened adjacent to the rails and excavation made to the top of the tie. After the rail was brought up to grade the gap between rail and shoulder plate was filled with white oak shims, varying in thickness from ⅛ in. to ½ in., and the rails spiked. A wooden form was set up on the edge of the rail base of such a height as to permit laying 4-in. brick to grade on a ½-in. sand cushion and this form was filled with concrete. Removal of the form left the base of the rail exposed. When the concrete was set thoroughly, hot asphalt was poured around the base of the rail and up ½ in. on the web. On top of the concrete 4-in. brick on a ½-in. sand cushion was laid 3 in. back from the rail on the gage side and 2 in. back from the rail on the outside. The space between was tamped tightly with Amesite flush with the top of the rail, the flangeway being cut by the car wheels. The surface was then rolled and hot pitch asphalt poured over the entire surface to fill any existing voids. At the expiration of about a week or ten days, an examination was made. Where settlement had occurred hot asphalt was again poured into the depressions and on top of this was tamped and rolled a Tarvia mixture with considerable small aggregate and sand content.

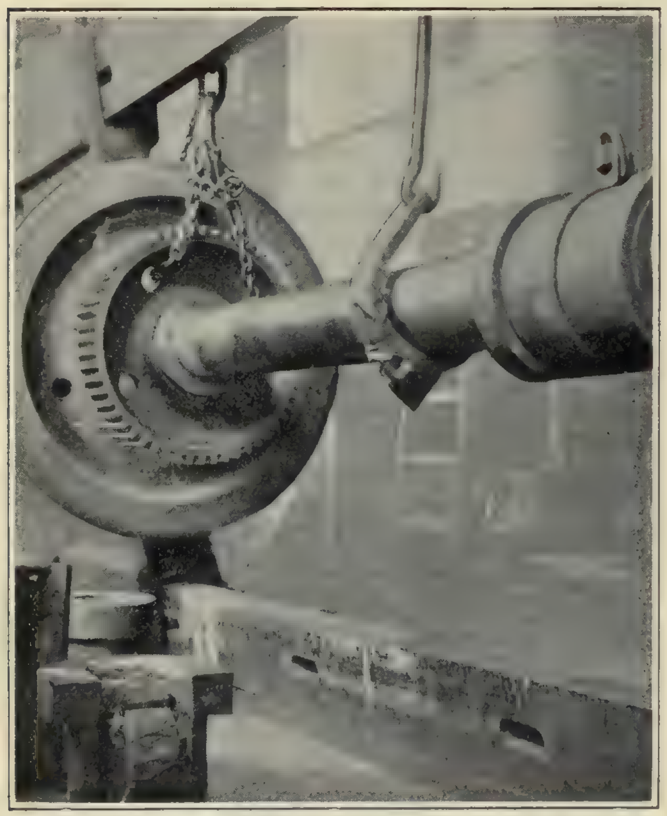
While this method of realignment of rails and adjacent paving is purely experimental great hopes are expressed that it will prove a success, and if so it will be of material assistance to the maintenance man where rails are too good to scrap and the pavement has several more years of life.

Wheels Removed and Pressed On Economically

PRESSING on and removing of wheels, together with the keeping of accurate wheel and axle records, is being given very careful attention in the shop of the Wilkes-Barre & Hazleton Railway, Hazleton, Pa. Where it is necessary to remove a worn-out wheel it has been found good practice to burn the wheel radially to within ¼ in. of the axle by means of an acetylene torch. By driving a wedge into the slot at the tread or by applying a slight pressure the seal is broken and the wheel is removed easily. This method has been found very economical due to the rapidity with which it can be carried out.

In pressing on wheels the danger of shaft distortion, so generally encountered by the usual pressing methods, has been overcome by the use of a specially designed thrust cylinder and mandrel. The cylinder is made of steel about 13½ in. long and 9½ in. outside diameter bored to fit snugly over the wheel fit, with the end pressing

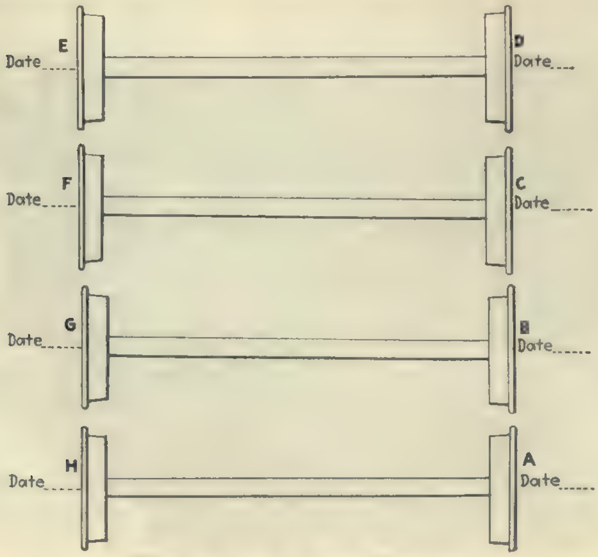
General Appearance of Rails and Pavement on State Street, Erie, Pa., Where Experimental Paving Method Has Been Installed



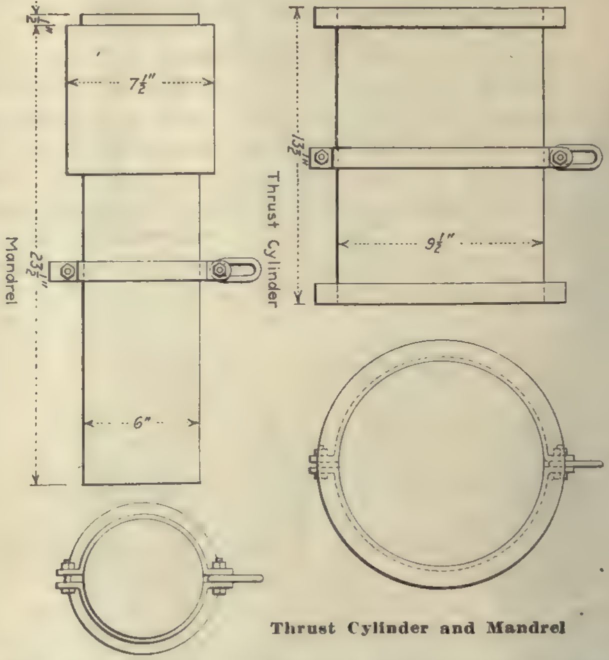
Wheel Being Pressed on with Thrust Cylinder and Mandrel

perfectly against the wheel seat. The mandrel is of steel about 24 in. long, 6 in. diameter at the small end and 7½ in. diameter at the large end. A ½-in. x 6-in. projection extends from the large end fitting the bore of the cylinder. This projection does not touch the end of the axle.

To press on a wheel the thrust cylinder is placed on the wheel fit with its face pressing against the wheel seat. The mandrel is next put on with the projection entered in the cylinder bore and the other end against the press ram. With this equipment the entire pressure is exerted against the wheel seat, thus eliminating the danger of shaft distortion due to shaft end pressure. This apparatus has proved very satisfactory and since its adoption not a single case of a distorted shaft has occurred.



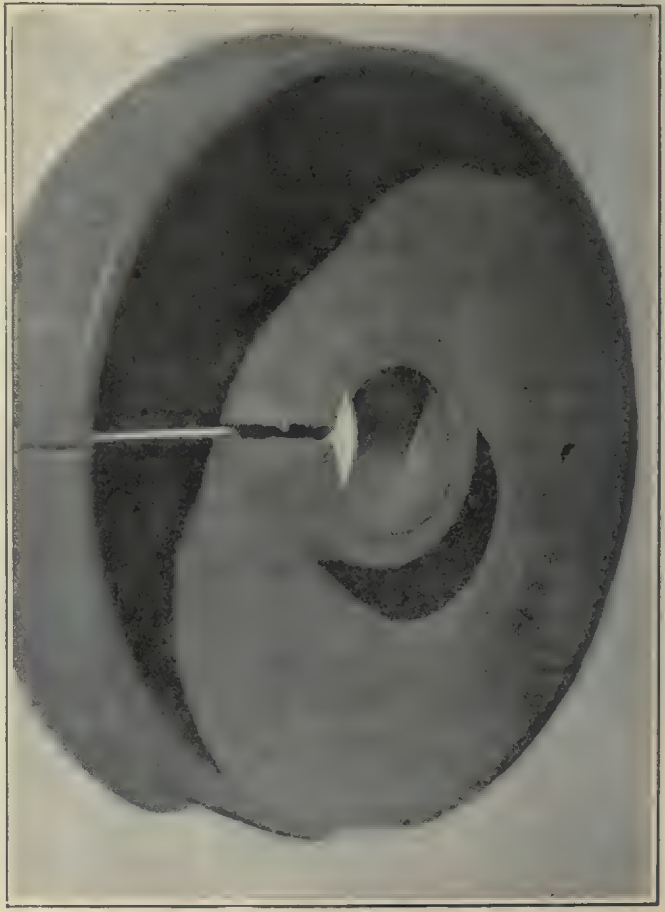
Wheel and Axle Record Stamping



Thrust Cylinder and Mandrel

The press used is of 400 tons capacity with a 25-ton release. All 36-in. wheels are bored 7 in. and are pressed on at a pressure of 75 tons. The pressure used for each wheel is kept on a recording gage chart and filed systematically for ready reference.

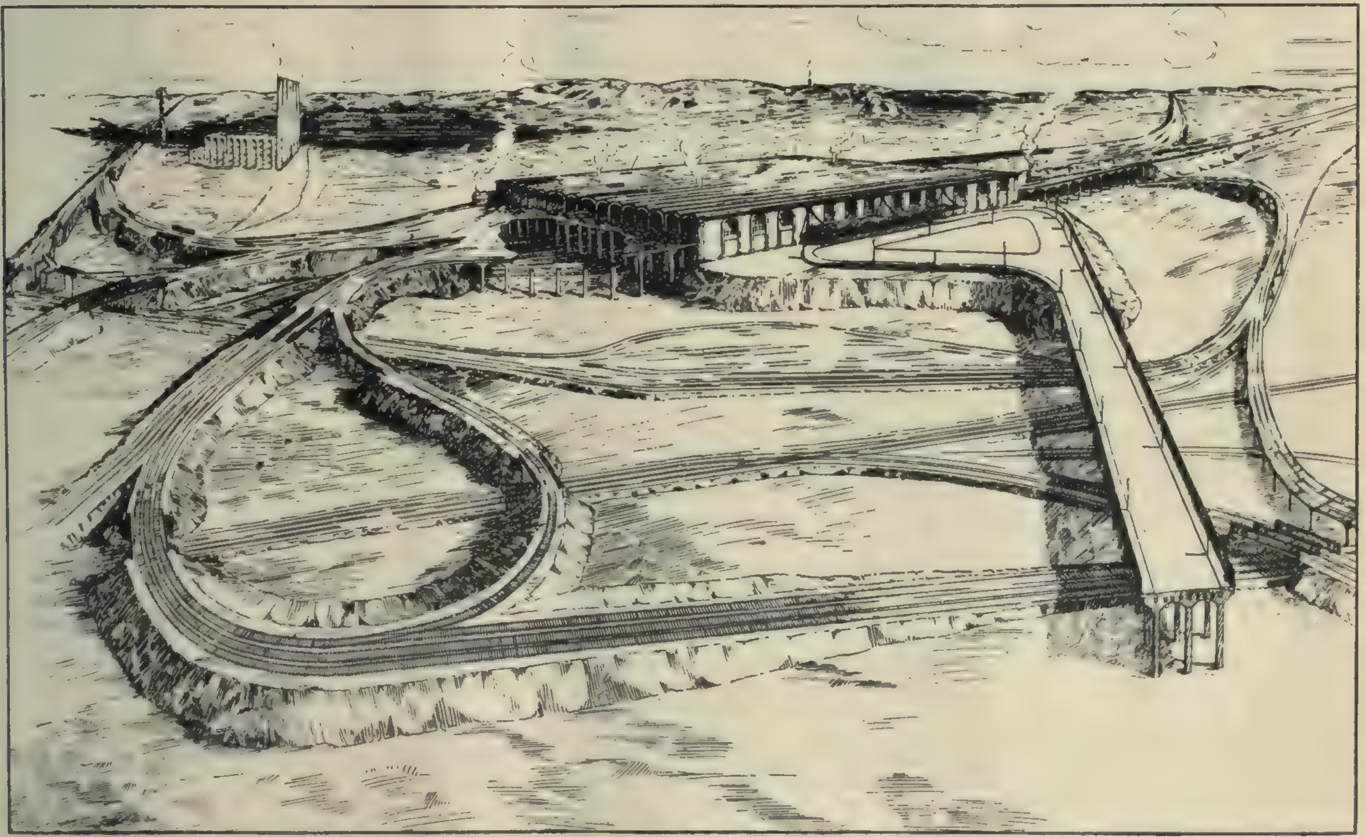
Each wheel of a car, together with the end of each axle, is lettered consecutively from A to H, along with the date it was pressed on. This record is suitably filed so that complete information on any wheel or axle is obtainable when desired.



36-In. Wheel Removed from Axle by Burning with Acetylene

New Plans for North Jersey Transit

Studies Made by North Jersey Transit Commission Embrace a Loop Line Between Manhattan Borough, New York, and the Steam Railroads Serving New Jersey Communities—Alternate Plans Provide for Various Contingencies—Many Differences from Proposals of Former Commission



Perspective of Proposed Meadows Transfer Station Near the Present Croxton Yard of the Erie Railroad

MARKED efforts toward elimination of former physical objections and definite recommendations for the speedy realization of the interstate rapid transit loop are features of the new report of the North Jersey Rapid Transit Commission, which was presented to Governor A. Harry Moore on Feb. 14. This report, prepared under the direction of Chairman Daniel A. Garber, follows an earlier report presented in 1926, and which gave somewhat similar recommendations although not in such complete form.

In order to obtain definiteness and clarity the report is presented in three major sections: Status of the physical plan, prepared by Glenn C. Reeves, assistant chief engineer, and Daniel L. Turner, consulting engineer; studies in means of financing, prepared by Philip H. Cornick, specialist in taxes and assessments, and opinion of counsel relative to district organization, prepared by Spaulding Frazer, counsel.

While the basic plan is the same as that reviewed in ELECTRIC RAILWAY JOURNAL for Feb. 6, 1926, page 239,[*] the commission, during the five months at its disposal, has by exhaustive studies broadened the entire scope of the project and developed several new features of outstanding importance. In addition, it has apparently established an *entente cordiale* not only with the managements of the steam roads entering New York but with the transit officials of New York City.

Briefly the new features are: (1) A transfer station at Journal Square, Jersey City. (2) Physical connections with the New York City Board of Transportation's Eighth Avenue subway and various changes in the 1926 plans for physical connections with the downtown subways. (3) A transfer station at New Durham, N. J. (4) Definite plans for extending the B.-M.T. Fourteenth Street-Eastern subway to Meadows Transfer Station. (5) Definite plans for extending the Interborough Rapid Transit 41st Street subway to connect with the New Durham Transfer Station. (6) An

ONE-WAY COMMUTER TRAFFIC ON NEW JERSEY STEAM RAILROADS FOR A TYPICAL DAY

	Excluding Passengers	H. & M. Per Cent	Including Passengers	H. & M. Per Cent
B. & O.	550	0.36	550	0.18
Central Railroad of New Jersey	28,106	18.59	28,106	9.12
Delaware, Lackwanna & Western	34,296	22.68	34,296	11.13
Erie	50,337	33.29	50,337	16.33
Hudson & Manhattan	......	......	156,986	50.94
Lehigh	980	0.65	980	0.32
New York, Ontario & Western	338	0.22	338	0.11
Pennsylvania	24,248	16.04	24,248	7.87
West Shore	12,351	8.17	12,351	4.00
Total	151,206	100.00	308,192	100.00

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[*] See also ELECTRIC RAILWAY JOURNAL, Feb. 7, 1925, page 222; Jan. 30, 1926, page 210; March 13, 1926, pages 444, 447 and 449; April 10, 1926, page 639.

independent subway through Manhattan in conjunction with the authorities of Westchester County, New York.

These new plans are predicated on a detailed study of passenger traffic into New York City on the various routes from New Jersey points. The accompanying table summarizes the information which was secured from an elaborate traffic count.

Basic Plan of 1926

1. Construction of a new North Jersey rapid transit system.

2. Hudson & Manhattan Railroad extensions in New Jersey.

3. Interborough extensions of its Manhattan lines to New Jersey.

4. Brooklyn-Manhattan Transit system extensions from Manhattan to New Jersey.

5. Extension of North Jersey rapid transit system, listed as part one of this program, to serve a larger area.

6. Electrification of existing steam railroads.

The North Jersey rapid transit system, part one of the program, would consist of the following five lines:

1. Interstate loop line, running north and south between the Hackensack River and Bergen Hill in New Jersey, passing under the Hudson River via a tunnel at the Battery, up through Manhattan to 57th Street and back through another tunnel to New Durham. Its length would be 17.3 miles. A so-called Meadows Transfer station would be located near the intersection of the Erie and Delaware, Lackawanna & Western Railroads.

2. A line from Paterson through Montclair and Newark, following the Interstate loop route through Manhattan to New Durham and thence to Rutherford and Hackensack. The length of this route would be 41.9 miles.

3. A line from Ridgewood via Paterson, Passaic, Rutherford, New Durham, the Interstate loop route in New York City, to Newark and Elizabeth. Route mileage would be 39.8.

4. An intrastate route from Elizabeth through Newark and Rutherford to Hackensack, 18.8 miles in length.

5. Another intrastate line from New Durham to Newark, 13 miles in length.

Of the nine steam railroads involved, four, the Central Railroad of New Jersey; the Delaware, Lackawanna & Western; the Erie, and the West Shore, now handling 83 per cent of the commuting population, will need to make a complete reorganization of their terminal operations, and three will have to move from their waterfront terminals to the other side of Palisades Hill.

The commission has laid the situation before the managements of the roads affected and has obtained the co-operation of practically all of them. The West Shore is recommending a rearrangement of its terminal facilities in accordance with the commission's plans; the Erie, whose traffic load is 33 per cent of the total and exceeds by 46.8 per cent that of any other system, has made helpful suggestions and still has the plan under advisement. In this stand the Erie has been joined by the Lackawanna and the Central Railroad of New Jersey, whose traffic loads are 23 and 19 per cent respectively. The Hudson & Manhattan (which receives 31 per cent of its total passengers from steam railroads) has agreed to the extension of its lines to the proposed Meadows Transfer Station. The Pennsylvania Railroad, which enters New York directly and hence is not particularly concerned in the steam commuter problem, has raised no particular objection to the plan. The Lehigh Valley is noncommittal.

On the basis of a request from the engineering staff of the Port of New York Authority, the advisability was considered of revising plans for the proposed 178th Street and Fort Lee Bridge so as to permit of at least four rapid transit lines passing over this structure.

JOURNAL SQUARE STATION

Returning to the outstanding modifications of and additions to the 1926 plan, the Journal Square Station, Jersey City, has been given considerable study because it is the locus of most of the bus and trolley passenger traffic on the west bank of the Hudson River. On a typical day the buses alone deliver 52,000 one-way passengers, most of whom use the Hudson & Manhattan tubes to New York City, so that any plan for traffic relief at this location affects both the Pennsylvania and H. & M. Railroads. "This plan," the report states, "proposes a rapid transit station to be located on the rock ledge which now forms the northeasterly side of the railroad cut in which the present H. & M. Journal Square Station is located. The station is to extend between the Hudson County Boulevard Bridge and a point some 250 ft. beyond the Summit Avenue Bridge. The rapid transit electric station platforms below are reached by ramps and stairs from a mezzanine over the electric tracks, which in turn is reached from the street level by additional ramps, one connecting with the Boulevard Bridge, another from Bascot and Magnolia Avenue, and another connection with the Public Service trolley plaza and the Hudson & Manhattan platforms. Entrances are also provided from Summit Avenue to this mezzanine. . . . Other studies for various routing through the Journal Square section which would not make use of the right-of-way of the Pennsylvania Railroad through the northern arch of the Boulevard Bridge also have been made."

Taking into account the colossal problem of financing the Interstate loop as a single unit and based upon suggestions of John H. Delaney, chairman of the Board of Transportation of New York City, the commission made nine different studies to determine the most advantageous routing for the North Jersey transit subway in order to make connections not only to the east side and west side Interborough lines but also to the independent system of the Board of Transportation. These plans include a Manhattan terminal building such as the present Hudson Terminal, utilization of the empty reverse movement capacity now existing on the local subway tracks during the morning and evening rush hours, and a general scheme that will not only collect the greatest number of commuters conveniently, but at the same time form a part of the final loop.

Of the nine studies, three of the most desirable are illustrated in this article. These are referred to as Schemes *F*, *G* and *I*. In all of these the North Jersey Transit Commission's subway line would enter Manhattan at the Battery. In Scheme *F* the line would bifurcate to make connections with local lines of the east side and west side Interborough subways, the former connection being south of Brooklyn Bridge with deep level stations under the east side line. This contemplates provisions for development of the Board of Transportation's subway plans.

P. H. Cornick

D. L. Turner

D. A. Garber

S. Frazer

G. C. Reeves

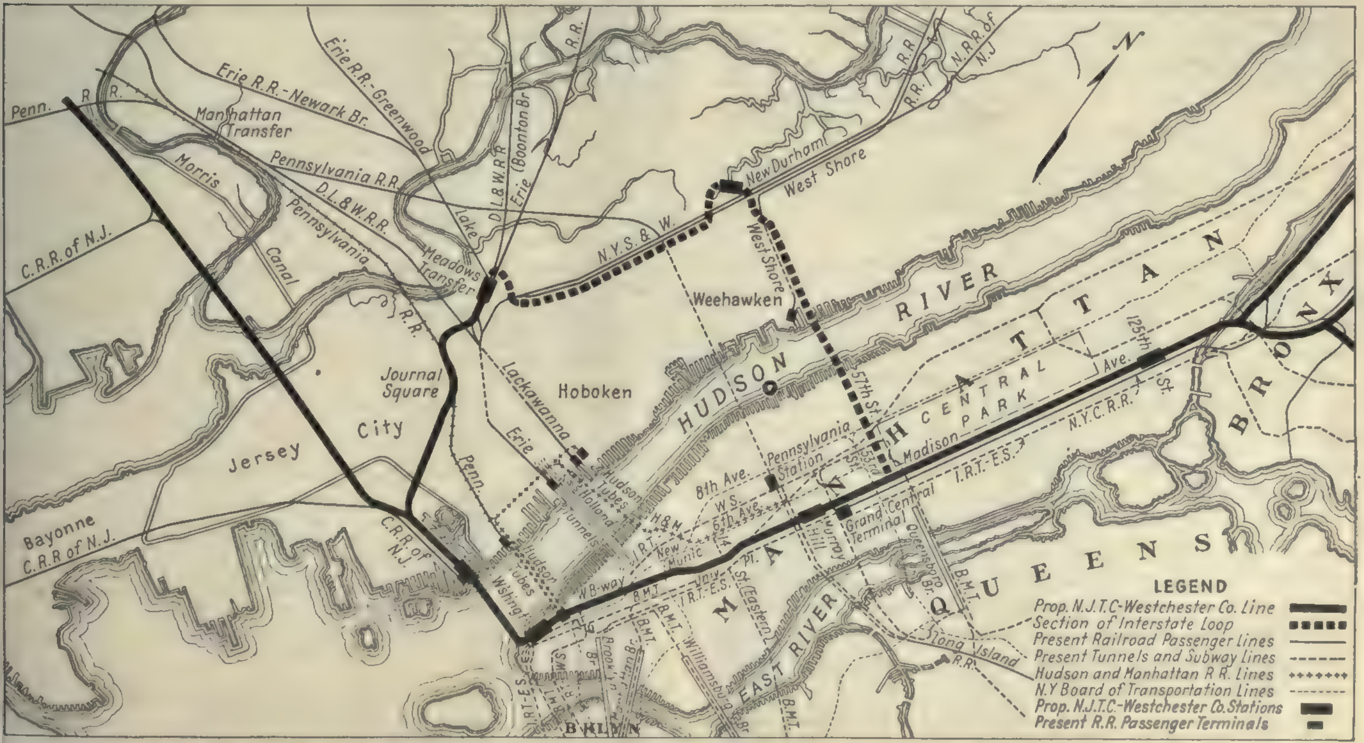
Men Responsible for 1927 North Jersey Transit Plans

Scheme *G*, on the other hand, proposes connections to both Interborough subways and also with the Board of Transportation's independent line in Church Street. The plan of the connection is shown in the map. Scheme *I* also proposes a connection to each of these three subways, but would include a cross-connecting track at Barclay Street. It also contemplates running the new line under Washington Street for the southern portion of the route, making connection with the east side subway at a point north of Worth Street.

According to the report, "all of the studies for one entrance into Manhattan have been made with the thought in mind that at some future time it would be necessary to have an independent commuter subway through Manhattan to connect with New Jersey. These schemes, *F*, *G* and *I*, are to be considered as a first step measure, and when the time does arrive for the independent commuter subway this first step construction would be used as a part of that independent line."

At New Durham, N. J., on the meadows opposite 57th Street, New York, the commission proposes a rapid transit station whereby the steam railroad passengers from the West Shore Railroad, the New York, Susquehanna & Western and the Northern Railroad of New Jersey will have opportunity to transfer to rapid transit electric trains for distribution in New York City or other parts of New Jersey when the comprehensive plan is accomplished. Four studies have been made for this station, any one of which would mean the removal of steam railroad passengers and local ferry passengers from the waterfront terminals. "This very important step," continues the report, "is one that should be made, and the West Shore Railroad is in sympathy with such a move."

Of the four plans presented, Scheme *D* provides for a complete separation of the Erie and West Shore Railroad tracks and platforms by a passageway or driveway leading to the ticket offices and other facilities. Directly over this passageway and parallel to the axis of the steam station platform are the electric tracks and platforms. To reach these platforms passenger bridges leading to a distributing concourse over the

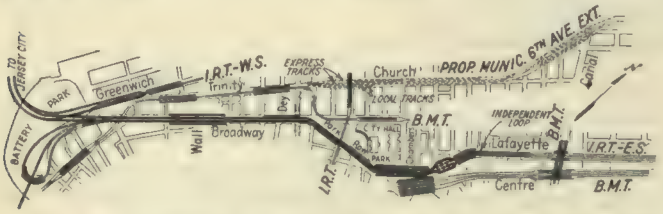


Route Planned for New Jersey-Westchester County (New York) Subway. One of the First Relief Measures Suggested by the Commission driveway and directly under the electric platforms are provided over the steam tracks.

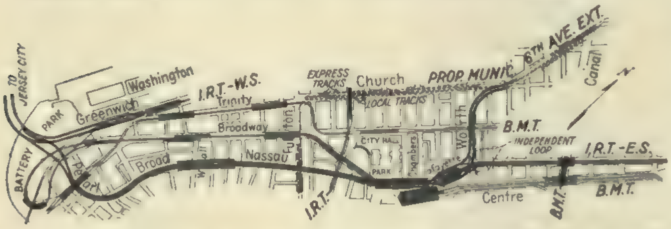
In order that this transfer station might be of service to the commuters, the minimum rapid transit construction required would be either the 57th Street trunk of the Interstate loop or the 41st Street extension of the Interborough subway. At this point recommendation is made that should the 57th Street tunnels be constructed before the Interstate loop, they should be made of sufficient size to accommodate standard railroad equipment.

B.-M.T. FOURTEENTH STREET EXTENSION

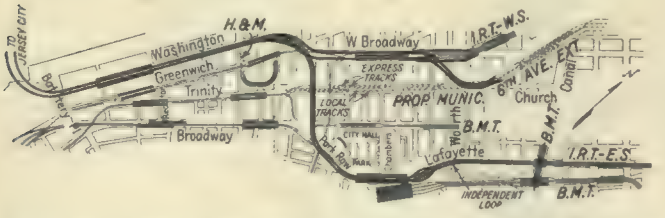
In regard to this extension the commission now makes these definite proposals as a means not only of effecting the most direct connection with the B.-M.T. subway for traffic of the Lackawanna and Erie, but of serving passengers from Hoboken and the heights section of Jersey City. The most advantageous route extends from Fourteenth Street and Sixth Avenue westward under the Hudson, emerging to the surface about Clinton Street, Hoboken, to pass into the side of Palisades Hill at Congress Street, where the route turns southward in subway into Palisade Avenue. Continuing under Palisade Avenue, the line turns into Franklin Street and thence into Manhattan Avenue, where, after the Hudson County Boulevard has been reached, it emerges in the western slope of the Palisades to continue on trestle to Meadows Transfer Station. This line will be stub-ended and the rapid transit electric trains will be returned over the same rails to New York City.



Scheme "F"—Proposed Physical Connection of the North Jersey Transit Line with the West Side Interborough Subway South of Rector Street and with the Local Tracks of the East Side Interborough Subway South of Brooklyn Bridge Station



Scheme "G"—Alternate Plan for Physical Connection of North Jersey Transit Line with East and West Side Interborough Subways and Subway of the Board of Transportation Now Being Built in Church Street



Scheme "I"—Which Proposes Physical Connections with the West Side and East Side Interborough Subways and Also with the Independent Subway of the Board of Transportation

"This is a very logical extension," the report states, "and should be made at the earliest opportunity. Conference has revealed that such an extension would be acceptable to the New York Rapid Transit Corporation." In addition it is pointed out that it might prove desirable to extend this line to New Durham Transfer as well and then return to New York via the 57th Street tunnels to connect with the stub-ended tracks of the B.-M.T. at 59th Street and Seventh Avenue, thus forming the upper trunk of the Interstate loop.

INTERBOROUGH 41ST STREET EXTENSION

All plans for the New Durham Transfer Station provide for the extension of the 41st Street Interborough subway line as part of the rapid transit system almost in a direct line under the river through Palisades hill to the New Durham transfer station, with a subway station on Franklin Street between Boulevard and Bergenline Avenues, Union City, N. J., which would serve a large portion of those local ferry commuters now depending upon the Weehawken ferries for transportation to New York City.

WESTCHESTER-NEW JERSEY COMMUTER SUBWAY

On this project the commission makes some very definite observations based upon the uncertainty of the present subway policy of New York City, which it believes might prevent the construction of connections to the subways. In such an event the commission urges a co-ordination of effort with the authorities of Westchester County, New York, for the construction of an independent subway from some point in that county through the entire length of Mahattan, under the Hudson River to the Central Railroad of New Jersey terminal at Communipaw. Thence one section would continue along the Newark branch of that road to its present Broad Street station in Newark, while the other section would extend to Meadows Transfer through the Journal Square section of Jersey City. On this point the report continues:

> This would furnish Newark with a rapid transit service in addition to that rendered by the Pennsylvania Railroad (Hudson & Manhattan) and at the same time would afford the suburban passengers of the Erie and the Lackawanna Meadows Transfer access to a rapid transit line for distribution in New York City. Such a line would be economical of operation in that the loaded trains from Westchester County would distribute their passenger load through Manhattan; then these same trains would continue to Newark and Meadows Transfer and return with another load of Manhattan-bound passengers. This is a slight modification of a part of the comprehensive plan as presented in the 1926 report. The main points of difference, however, are only temporary in that the southern trunk of the proposed North Jersey Transit System would terminate at Newark until the comprehensive plan can be fully developed instead of continuing to Paterson or Elizabeth, and the Manhattan trunk would be continued to Westchester County until the 57th Street line or northern trunk of the Interstate loop could be constructed.
>
> In the event that the complete Interstate loop commuter subway cannot be developed and financed as a unit, then the first section of that loop constructed should be an express and local service line from and including Meadows Transfer station to a physical connection with the downtown Manhattan subways.
>
> Should the subway policy of New York prevent this physical connection to downtown Manhattan subways, then the first step of construction should be (in conjunction with the Westchester County of New York State) the Westchester-Meadows Transfer-Newark commuter subway.

PLAN OF FINANCE

The section of the report dealing with finance, comprising some eight chapters, is a powerful argument as to the fallacy of financing such a project by a private corporation. Admitting that there are probably one or two railroad companies in the North Jersey transit district which have reserves adequate for the establishment of their own commuter terminals in New York City, the report dismisses these as local and, continuing, comments:

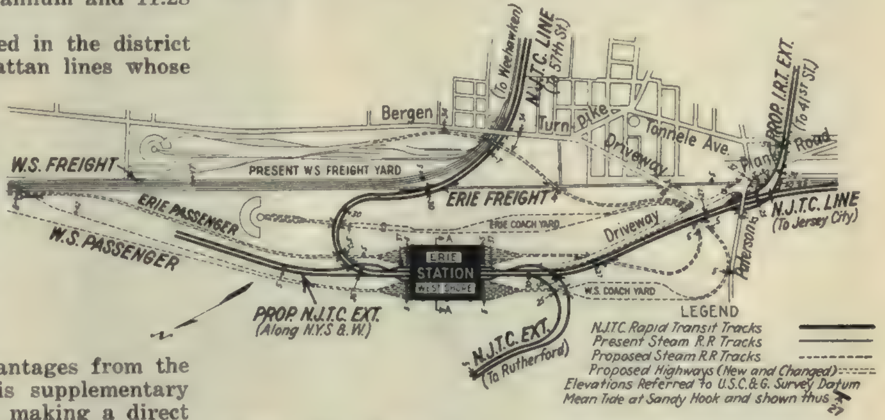
"So far as any comprehensive plan for rapid transit is concerned, however, no public body and no conceivable combination of private agencies is in position to provide accumulated capital sufficient for its consummation."

The commission also frowns on anticipated revenues as a means of financing the project and makes it clear that the only revenues that could be made available for construction costs would be those derived from taxes as special assessments. The report continues:

> The only remaining alternative is that of basing the financial plan, in part at least, in anticipating future revenues—in other words, the issuance of bonds to be supported out of operating revenues, taxes, special assessments, or a combination of all three. If the bonds are to be supported solely by fares and additional revenues from advertising, your engineers have estimated that the cost for total expenses would require a fare of 16.56 cents per passenger on a basis of 125,000,000 passengers per annum and 11.28 cents on a basis of 250,000,000.
>
> The nearest comparable service rendered in the district is that supplied by the Hudson & Manhattan lines whose fare is 5 cents for intrastate passengers and 6 or 10 cents for interstate passengers, depending on their destination in New York. It is open to question, therefore, whether it would be feasible, wise or desirable to rely solely on anticipated future operating revenues as a means of supporting construction costs. If that be granted, revenues derived through the taxing power would be needed at least to supplement operating revenues.
>
> A concrete example will serve to illustrate the relative advantages and disadvantages from the standpoint of the taxpayer of using this supplementary source as a basis for a bond issue, or of making a direct levy for construction funds as they are needed. The preliminary estimates made by the engineers of the cost of constructing the interstate loop (exclusive of land costs) totaled $154,000,000. Assuming a seven-year construction period and equal yearly expenditures throughout that term the annual requirements would amount to $22,000,000.
>
> In order to provide this from current tax revenues a levy amounting to $5.44 on every $1,000 in the net valuation taxable for 1926 in the North Jersey Transit district would be necessary. The weighted average tax rate imposed on the same base in 1926 for all purposes was $39.63 per $1,000. Assuming that all other governmental expenditures were to remain constant and that there were to be no change in assessed valuations, this additional burden would require an aggregate average tax rate of $45.07 per $1,000 for the seven-year period.
>
> If, on the other hand, seven successive bond issues for $22,000,000 each were to be made during the construction period, each issue running for 35 years and bearing interest at 4½ per cent per annum, and if sinking funds were assumed to earn at the rate of 3½ per cent yearly, then the increase in tax rate would amount to only 31 cents per $1,000 of assessed values of the first year. It would increase 31 cents per year during the remaining six years of the construction period and would then remain constant at $2.19 per year for 28 years.
>
> If current revenues from special assessments were to be relied on, the increased burden would, of course, remain the same, but the base against which it was levied would be considerably narrower. It is evident, therefore, that no plan for financing construction costs direct from current revenues, and without resort to bond issue, can be carried out for a work of the magnitude of the proposed Interstate loop without bringing about an unduly severe increase in the current burdens which already fall on taxable or assessable property.

Following the foregoing analysis, the commission makes the following conclusions relative to choice of means of financing that would seem to be warranted:

> 1. *That the proposed North Jersey Transit System be publicly financed and publicly owned.* It is true that the only rapid transit system now operating in the North Jersey transit district was provided by private capital. It is probable, furthermore, that certain of the railway companies which handle large numbers of commuters in this district have the capital and credit necessary to provide rapid transit connections with New York City for their passengers. Nevertheless, all such operations, desirable though they may be, can provide only local and temporary relief; and there is slight probability that any one company, or any group of companies, can provide the necessary capital for a transit system of the type which the North Jersey Transit Commission believes to be essential to the continued and symmetrical growth of the territory comprised within the district.
>
> 2. *That the bonds to be issued for construction costs be supported by supplementary pledges of full faith and credit based on the taxing power.* Regardless of the types of revenues which are to be pledged to the support and retirement of bonds, the supplementary pledge of full faith and credit is essential to obtaining the lowest interest rates.
>
> 3. *That the maximum term of all bonds issued for transit developments, regardless of the specific part of the work for which they are to be issued, be fixed at 35 years.* The completion of a rapid transit system in this region will inevitably bring new population, and an attendant increase in problems, for whose solution further bond issues will be needed. The imposition of long-deferred burdens which will fall on future generations, who will have abundant current burdens of their own, is therefore to be avoided.


(To Weehawken)
N.J.T.C. LINE (To 57th St.)
PROP. I.R.T. EXT. (To 41st St.)
Bergen
Turn Pike
Tonnele Ave.
Driveway
Plank Road
W.S. FREIGHT
PRESENT W.S FREIGHT YARD
ERIE FREIGHT
ERIE PASSENGER
W.S. PASSENGER
ERIE COACH YARD
Driveway
N.J.T.C. LINE (To Jersey City)
Paterson
ERIE STATION WEST SHORE
W.S. COACH YARD
PROP. N.J.T.C. EXT. (Along N.Y.S. & W.)
N.J.T.C. EXT. (To Rutherford)
LEGEND
N.J.T.C. Rapid Transit Tracks
Present Steam R.R. Tracks
Proposed Steam R.R. Tracks
Proposed Highways (New and Changed)
Elevations Referred to U.S.C.&G. Survey Datum Mean Tide at Sandy Hook and shown thus
27

Scheme "D"—Proposed Transfer Station at New Durham, N. J., for Commuters on Several Branch Lines of the Erie Railroad and for the West Shore Railroad. This Plan Has Been Indorsed by the Latter Road

SPECIAL TAXING POWERS ASKED

In the main the legal section of the report is a plea that the commission be empowered with authority to levy taxes within the territory affected:

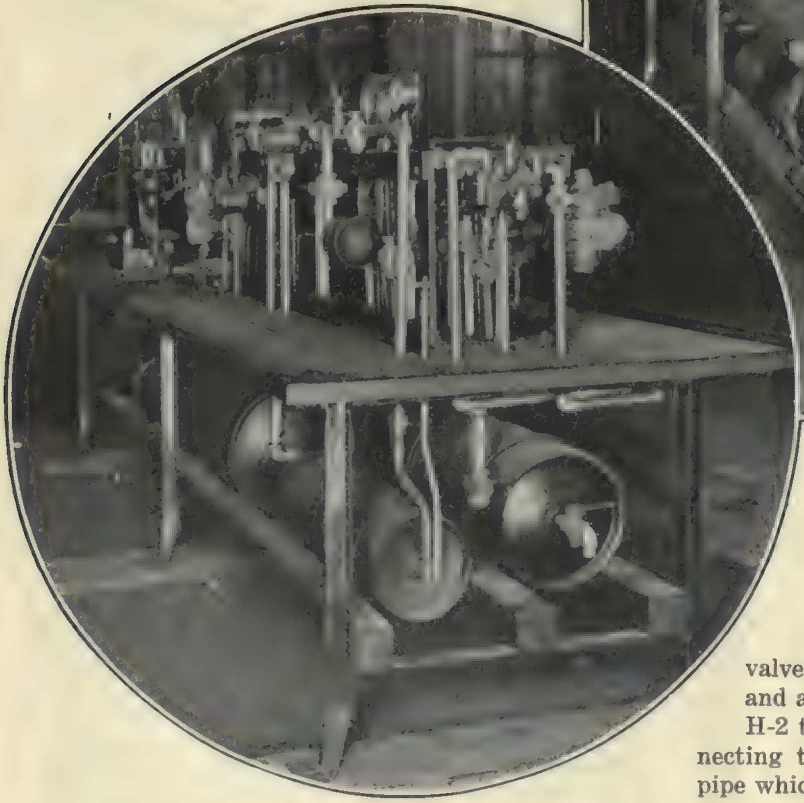
> A study of the portion of this report dealing with the physical and financial aspects of the transit situation shows that no type of agency now in existence, except that of state authority financed by general state tax or by state bond issue, similar to the existing Highway Commission, can bring to the problem powers adequate for its solution.
>
> And yet the problem, despite its magnitude and the large territory involved, is essentially a district problem, in which other portions of the state have naturally either no interest at all, or, if we bear in mind the rapidly growing Camden metropolitan section at best so slight an interest as to make the proposal of state-wide authority supported by the contribution of the whole state, whether in the form of direct tax or of bonds, one which must seem obnoxious to the voters of those parts and therefore, quite naturally and properly, one which, except under unusual conditions, would scarcely receive the support of the senators and assemblymen from those counties. . . . Many commissions have been granted assessing powers, and this has been upheld not only in state courts but in the broadcast terms by the federal Supreme Court as in no way violating the due process and equal protection clauses of the federal Constitution.

Air Equipment Tested in Place on Cars

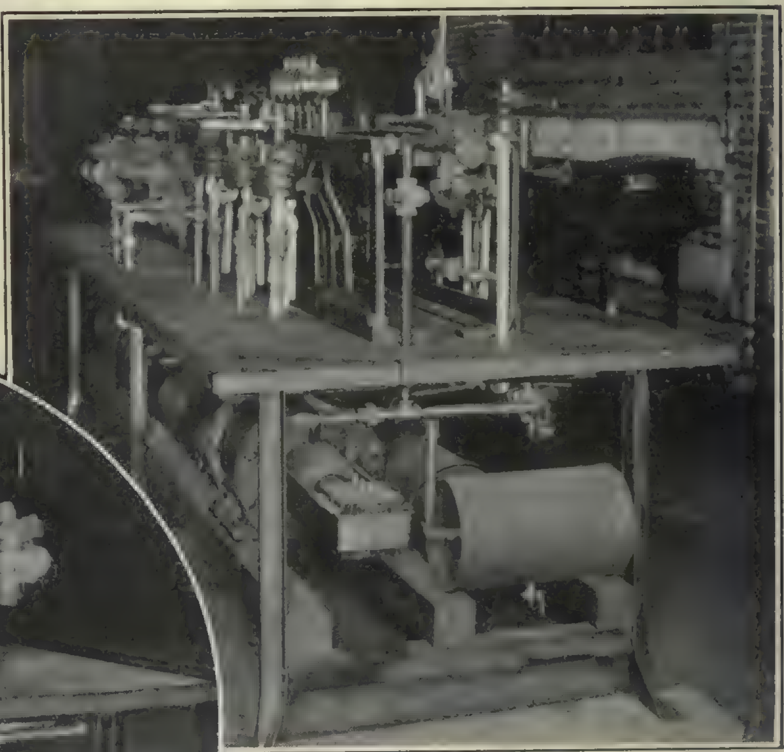
Thorough Testing of Triple Valves, Motorman's Valves, Brake Cylinders, Feed Valves and Other Parts by Means of a New Test Rack Has Eliminated Many Troubles on the Cars of the Indiana Service Corporation

By Arthur W. Reddersen
Superintendent of Motive Power Indiana Service Corporation, Fort Wayne, Ind.

EACH piece of air apparatus used on either city or interurban cars of the Indiana Service Corporation is given a thorough test by means of an air brake test rack, recently completed and installed as a part of the equipment of the Spy Run shops at Fort Wayne. The air supply for operating the rack is furnished by a 225-ft. shop compressor, located in the basement. Air lines from this run to the rack and also to the various shop pits for careful testing of the equipment in place on the cars. Where desirable, equipment may also be removed and taken to the rack for testing.



Space on Top of the Bench Around the Test Rack Provides a Convenient Place for Tools When Making Adjustments



The Brake Cylinder Installed Underneath the Bench Is Provided with Blocks so that Different Length Piston Travel Can Be Obtained.

The top of the bench on which the various pieces of air brake test equipment is installed is 14 ft. long, 46 in. wide and 36 in. above the floor. In the center is a framework built up of 2¼-in. x ⅜-in. angles. It is 11 ft. 4 in. long, 18 in. high and 14 in. wide. This is bolted to the top of the bench and braced at each end so as to leave 16 in. of bench space all the way around, providing a convenient place for tools when testing and making adjustments. All pipe brackets are mounted on the framework, with the necessary cut-out cocks located in the pipe lines between the brackets and top of the bench.

A brake-pipe line is run in the basement of the shop to the tracks where box cars and all non-compressor car repair work is done, so that after the brake rigging has been overhauled and the triple valves and brake cylinders cleaned and lubricated a test is given for piston travel before the car is again returned to service.

A brake cylinder located under the bench is operated when any triple or brake valve is being tested, unless this cylinder is cut out by closing the double cut-out cock above the bench. A yoke is attached to the non-pressure head of the brake cylinder so that by dropping in blocks of various thicknesses any given piston travel may be obtained and the result indicated on the brake cylinder gage.

Automatic engineer valves and triple valves are tested on one side of the rack. Feed valves, governors, safety valves, gong ringers, door engines, low-pressure city brake valves and emergency valves are connected in with the straight air brakes and are tested on the opposite side of the rack. An H-2 triple valve application test is provided by connecting the brake pipe to atmosphere through a ⅜-in. pipe which runs above the bench with a cut-out cock on the end. The cut-out cock is plugged at one opening. The plug is drilled with a hole of the proper size so that the brake pipe pressure is reduced from 70 lb. to 50 lb. in ten seconds when the cut-out cock is open. Two duplex and six single-pointer test gages are used on the rack, each mounted so as to be in the operator's direct range of vision while tests are made.

Following are some of the troubles that have been overcome through the building of the rack:

Previous to the installation and use of the present careful testing methods frequently a triple valve would be removed from a car on account of a defective slide valve. Either the inspector would fail to mark the cause of removal or the tag would become destroyed before the triple valve arrived at the repairman's bench. The repairman, not being able to detect the defective slide valve, would clean the valve and mark it O.K. An inspector would again put the triple valve on a car, only to find that the slide valve was defective. This often necessitated going to the shop for another triple valve and caused delay to the train as well as unnecessary expense in getting proper equipment to make the car pass the test.

Since the installation of the test rack, triple valves are given a test after cleaning. Those found to have defective slide valves are sent to the factory for a general overhauling. After being cleaned all feed valves are given a rack test and a code test, as recommended by the Westinghouse Air Brake Company. If they do not pass this test, they are also sent to the factory for general overhauling.

The rack has been arranged so that it can be used for instruction, as well as for testing purposes. Motormen being instructed on car equipment can thus be shown what actually happens in addition to obtaining explanations of the various operations. These include particularly the time required to charge the auxiliary reservoirs after a train has been made up and the importance of waiting until all auxiliary reservoirs are charged before attempting to make a terminal brake test. Motormen are also shown that when making a brake application it is useless to reduce the brake pipe pressure below the point of equalization. The importance of stopping the brake pipe reduction when the point of equalization has been reached is explained. This instruction has proved very beneficial.

The Readers' Forum

Extensive Rehabilitation Programme Planned by South Carolina Power Company

CHARLESTON, S. C., Jan. 22, 1927.

To the Editor:

An extensive program of improvement and modernization has been mapped out for the railway department of the South Carolina Power Company. This includes track renewals, the substitution of improved rolling stock for worn-out or obsolete equipment, and an advertising campaign to "sell rides" in connection with the improvements.

It has been recommended that all cars in regular service be equipped with comfortable, upholstered seats, and with floor covering. All cars will be painted in our new standard color, a bright orange, and instead of being lettered will carry a distinctive insignia emblematic of the company.

It is our opinion that by furnishing the public economical, safe and dependable service, and keeping that picture prominently before their eyes, we can increase our gross revenue to such an extent that with the attendant economies in operation, we can finally pull a mighty sick patient out of the hospital.

H. BIGELOW,
Superintendent of Railway.

Careful Inspection Program Gives Good Results

PHILADELPHIA RAPID TRANSIT COMPANY
PHILADELPHIA, PA., Jan. 20, 1927.

To the Editor:

Before the present one-man, two-man, front-entrance, center-exit cars were adopted as standard on the Philadelphia Rapid Transit Company lines a very thorough study was made of the operating requirements in this city. The variety of transportation requirements led us to believe that a car of the maximum flexibility was necessary for our purpose, and we feel that our present type is the best which has yet been developed to fulfill our needs. Our fare collection system was also developed from a standpoint of giving the maximum of adaptability to all our service requirements. It is possible to operate one of our standard cars over any of our surface lines and in the surface car subway on Market Street. We will probably continue to standardize on this car design until some later development appears which will prove even more desirable for use in our co-ordinated transportation system.

It is true that we have not placed a great deal of emphasis upon interior fittings which approximate the luxurious. Deep spring seats with leather upholstery have doubtless proved very satisfactory in many applications, but we have thus far found it expedient to retain the wooden seats, both lengthwise and crosswise. Great care is manifested at all times, however, to keep the cars thoroughly clean and attractive, both inside and out. We have adopted a very positive schedule for car cleaning and inspection, and as a result we have succeeded in reducing our electrical and mechanical failures from a total of 15,035 in 1921 to 2,102 in 1926.

To obtain this gratifying result the following schedule for car cleaning and inspection has been adopted:

Daily—The interiors of the cars are washed thoroughly with a solution consisting of one part disinfectant to fifteen parts of water.

Weekly—The interiors of the cars are cleaned thoroughly and the exteriors are given a complete washing.

500 Car-Miles—At the end of this period, the so-called "A" inspection is given to the cars. This consists of a careful mechanical inspection of fundamental brake equipment, control equipment and current collection equipment.

2,500 Car-Miles—After this interval the car is given both an "A" and "B" inspection. The "A" inspection was described above. The "B" inspection consists in giving the cars a thorough lubrication of the controls, motors, compressors, etc.

7,500 Car-Miles—At this time the cars receive a complete electrical and mechanical inspection which covers all operating parts of the cars.

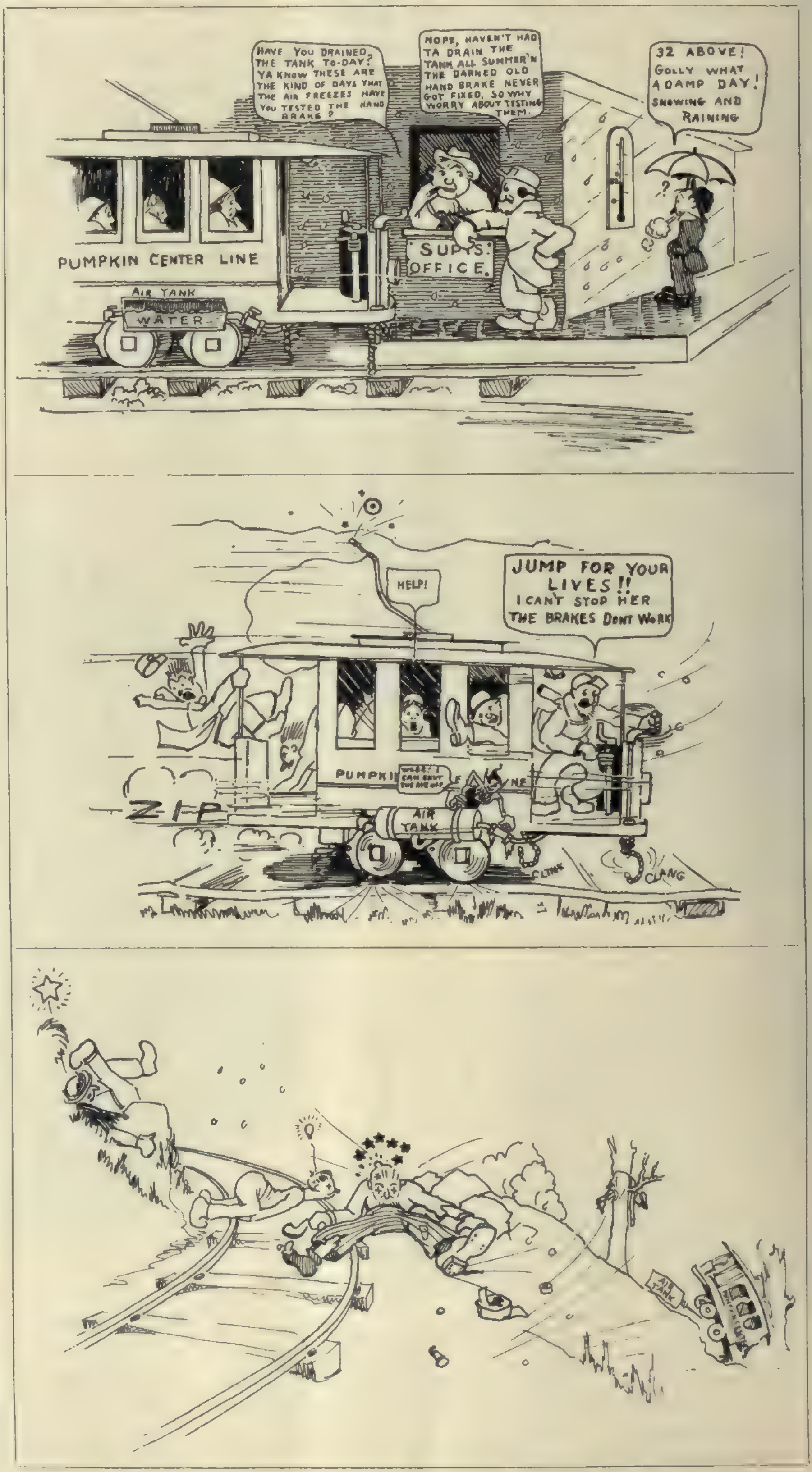
60,000 Car-Miles—When this limit is reached every car is completely overhauled and sent through the paint shop.

Not only has this system succeeded in reducing the street failures to a remarkable extent but it has also had a very favorable reaction from the public. Frequent comments are heard on the cleanliness and well-painted appearance of the surface cars, and we find that our conductors and motormen react very favorably to public appreciation shown for presentable rolling stock. The cost of cleaning and painting cars is after all but a small price to pay for the gratifying returns in public good will and in improved morale which is bound to follow, and this does not take account of the material savings in maintenance expenditures which result from reduced street failures.

G. H. STIER,
Superintendent Rolling Stock and Buildings.

Adventures of
Old Man Trouble on the Hicksville Railway

The Electric Car Is Not an Aquatic Animal


HAVE YOU DRAINED THE TANK TO-DAY? YA KNOW THESE ARE THE KIND OF DAYS THAT THE AIR FREEZES HAVE YOU TESTED THE HAND BRAKE?
NOPE, HAVEN'T HAD TA DRAIN THE TANK ALL SUMMER'N THE DARNED OLD HAND BRAKE NEVER GOT FIXED. SO WHY WORRY ABOUT TESTING THEM.
32 ABOVE! GOLLY WHAT A DAMP DAY! SNOWING AND RAINING
PUMPKIN CENTER LINE
AIR TANK
WATER
SUPT'S. OFFICE
HELP!
JUMP FOR YOUR LIVES!! I CAN'T STOP HER THE BRAKES DON'T WORK
WHEE! I CAN SHUT THE AIR OFF
ZIP
AIR TANK
CLINK
CLANG
AIR TANK

Air reservoirs should be drained often in cold weather and hand brakes should be tested on every trip. Dry reservoirs and piping constitute the surest way of avoiding freeze-ups.

ELECTRIC RAILWAY JOURNAL will be glad to furnish press proofs of this page free of charge for posting on bulletin boards and will supply electrotypes of this series at cost for use in company publications.

M. ZIMMERMAN and E. L. PROCTOR

Maintenance Notes

Weekly Washing Keeps Cars Attractive

BY A. F. REXROTH
Master Mechanic Harrisburg Railways, Harrisburg, Pa.

BELIEVING that clean cars are one of the greatest inducements to ride, the Harrisburg Railways, Harrisburg, Pa., devotes particular attention to car washing. Cars are scrubbed and washed with soap every seven to ten days and a more general and thorough scouring and cleaning are given once a year. In the general cleaning Wyandotte detergent is used.

This is a scouring preparation somewhat like pumice. From 8 lb. to 10 lb. of this preparation is used to about 8 gal. of hot water. This quantity will clean and scour a 48-ft. car inside and out. An accompanying illustration shows a car as it is being scoured by this process. A marked contrast is shown in the car portion which has been washed and that which has not as yet received the treatment.

The Light Part of the Panel has Just Been Cleaned. The Remaining Part of the Car Is in Its Original Condition

The keeping of cars clean and attractive has been facilitated somewhat by the use of the enamel system of car painting that was adopted some time ago to replace the paint and varnish system. Cars now receive two coats of enamel, which is the equivalent of a three-color paint job.

> *Be Wise, Systematize,*
> *Open your eyes, Modernize*
> *And thus Economize.*

> *"Join the K.K.K.'s"*
> *"Keep Kars Klean"*

This enamel is placed over the old paint and a good job is obtained. After a car has been newly enameled a record is placed immediately under the water table showing the date and kind of job done. Thus the designation "E-1-15-27" would show that an enamel job was done on the car on Jan. 15, 1927.

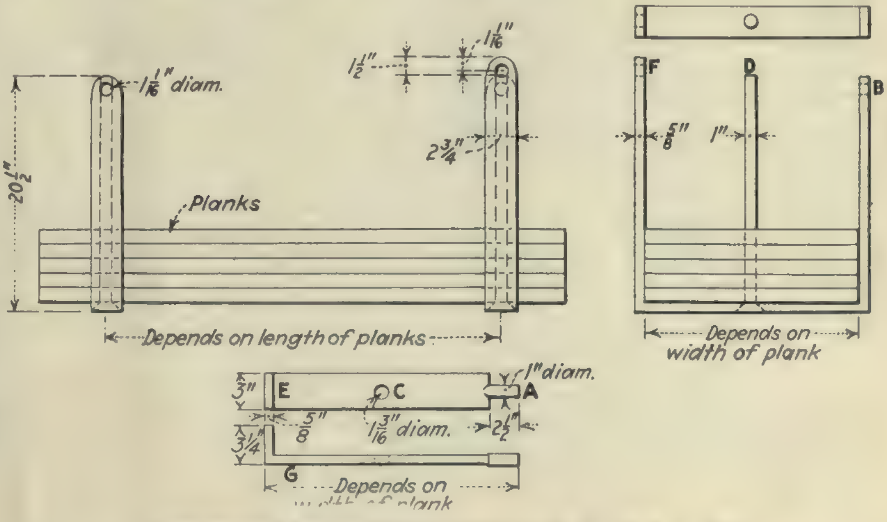
The second time that a car is brought in for refinishing by the enamel system it is given but one coat of enamel and is then restriped and relettered. By this method cars are kept in attractive condition without great expense.

Receptacle for Scaffold Plank Storage

IT IS a common occurrence for the paint shop organizations to be annoyed and their work retarded when men of other departments remove scaffolding planks from the paint shop and utilize them for other purposes. This was particularly true in the shop of the Washington, Baltimore & Annapolis Electric Railroad, Academy Junction, Md. To overcome this objectionable condition and assure the painters that the planks would always be at hand when required, George Watts, foreman painter, designed and built a receptacle for the storage of the scaffolding planks which has not only permitted uniform and neat storage but provided a means for locking them securely to prevent removal.

There are two ⅝-in. x 2¾-in. bar-steel U-shaped frames, each with a piece of 1-in. round bar riveted at the center of the bottom. A ⅝-in. x 3-in. flat steel strap slips in suitable holes in the uprights and provides a means of padlocking. Each plank has a 1⅛-in. hole bored in the center about 12 in. from either end. The planks are impaled in the upright posts. After the clamp is placed in position and locked it is impossible to remove any of these planks unless the padlock or other parts are destroyed. Planks not in use during the day are kept locked and the key is retained by the foreman of the paint shop. At the close of the day all planks are returned to their receptacles and locked.

This method has resulted in eliminating paint shop delays. The planks are always at hand when required. Accidents caused by breakage have been reduced since the planks are not being used for purposes for which they were not designed.

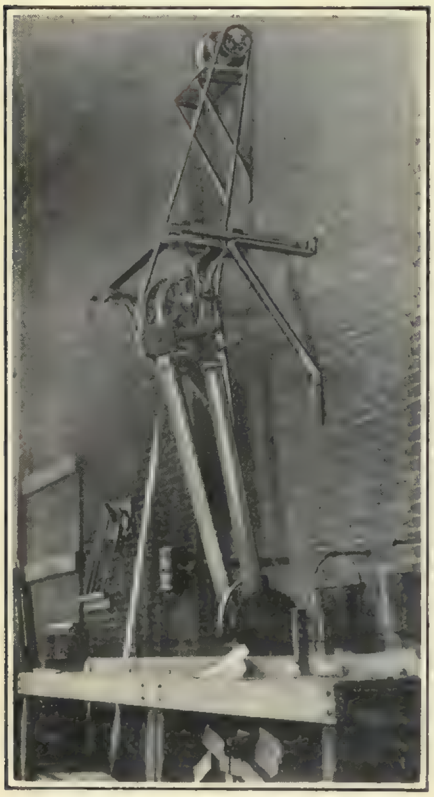


Appearance of Scaffold Storage Used in the W., B. & A. Shop

Rod *A* slips into hole *B*, rod *D* passes through hole *C*. Surface *G* rests on top plank. Holes *E* and *F* are in line and are fastened with a padlock.

Saw Belt Driven by Air Compressor Motor

INDIVIDUAL electric drive for a circular swing saw has been provided in the shop of the Lackawanna & Wyoming Valley Railroad, Scranton, Pa., through the utilization of an air compressor motor. This motor is suspended from the side wall directly above the saw by means of strong, rigid brackets and is belted through a countershaft. All of the shop requirements for this class of work are easily handled by this unit.



Circular Swing Saw Belt Driven by an Air Compressor

Utilize the PEP in the uPkEeP of your equipment.

Pull-in Classifications Corrected

IN THE table published on page 250 of the issue of Feb. 5 giving a comparative statement of car pull-ins for the year 1926 as reported by the Electric Railway Association of Equipment Men, Southern Properties, the headings "Not chargeable to carhouse" and "Chargeable to carhouse" were reversed. The lower table should have carried the first heading and the upper table the second heading.

Dick Prescott Considers Shop Policy

And Reaches a Conclusion

DICK PRESCOTT, assistant shop superintendent of the Consolidated Railway & Light Company, spent considerable time studying the design of the springs used by the company for replacements on various types of trucks. Following his investigation of the use of wood blocks to compensate for sagged springs he found that the practice of ordering replacement springs by sample had led to considerable variation in the materials obtained, with consequent unsatisfactory performance in service.

Study of the subject led him to a careful check of the operating loads on various types of equipment in service, and finally to the preparation of a series of drawings and specifications covering the types of springs needed for replacement purposes on each series of equipment.

"Here," concluded Dick, "is the kind of work that should be done by the engineering forces in a maintenance organization."

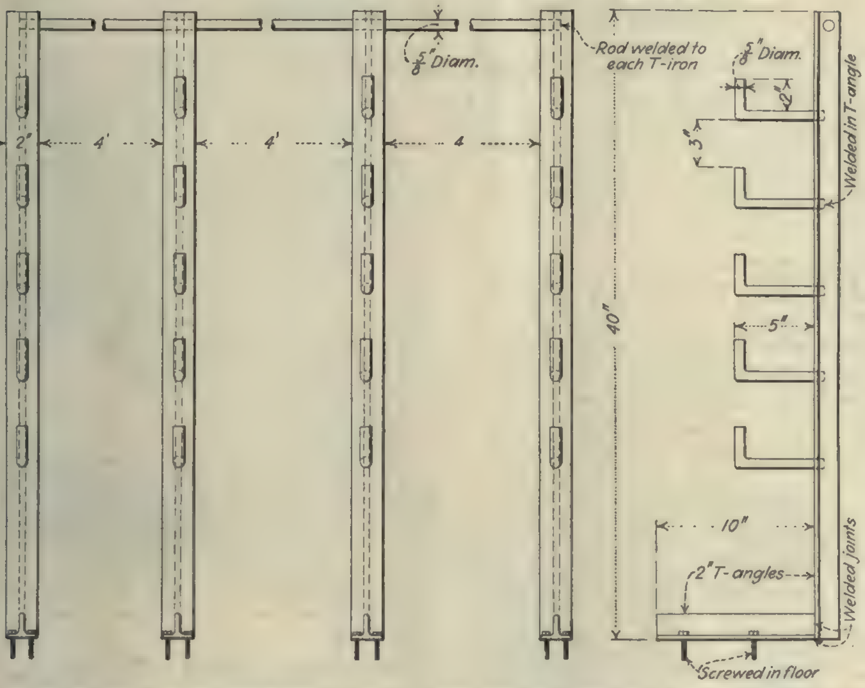
This particular subject was one to which Dick Prescott had devoted considerable thought. He had found in the Consolidated shop a general tendency to manufacture many parts, which he believed could better be obtained from regular manufacturers. True, there were machines and men available, and the manufacture of parts tended to give the shop a better load factor. So there had always existed a question as to just what constituted a sound shop policy in regard to the manufacture of parts. With the development of an engineering offce in the shop there was an even greater tendency than formerly toward manufacturing activity.

Dick had established a clearly defined policy in his own mind. "The question of delivery is one of the important factors in drawing the line between manufacture and purchase," he concluded. "Here again the stores and purchasing departments are important elements. We have a tendency to order replacements in ridiculously small quantities, and unquestionably this habit affects both the matter of delivery and cost. Careful checking of inventories and renewal parts consumption per year; closer co-operation between the shop, storeroom and purchasing department, and adoption of a general policy of buying all parts possible, even when there is a slight price shade in favor of home manufacture, would improve our situation."

His study also led to the conviction that it was hard to obtain the actual cost of manufactured parts and that the factors of quality and uniformity were sometimes stretched in favor of the shop's own output. But despite all this, he felt that there was an even more important reason for avoiding home-made manufacture as much as possible. "A railway shop," he concluded, "is primarily a maintenance organization. Its resources should be devoted to the improvement of maintenance practices and not to the manufacture of items that can be purchased from reliable manufacturers. An organization which devotes itself to the manufacture of a wide variety of parts does not give the attention which is needed to improving maintenance procedure and methods. This affects particularly the men in supervisory or technical positions. When the shop becomes a manufacturing organization, it attracts the major attention of the men in key positions, from the head of the department down. For that reason, attention which should be devoted to the primary problems of maintenance is diverted elsewhere, and the principal function of the mechanical department is left very much to drift, while the problems of manufacture absorb attention."

Dick was so impressed with the soundness of these views that he undertook the preparation of a report on this subject to the company's operating staff for Tom Mullaney's signature.

Rack for Storage of Light Bar Steel



Rack Installed in Norfolk Machine Shop of the Virginia Electric & Power Company for Storage of Light Bar Steel

BELIEVING that the appearance of a machine shop floor reflected the character of the work being performed, Master Mechanic T. W. Madison of the Virginia Electric & Power Company, Norfolk, Va., designed and erected a compact rack in the machine shop for the storage of assorted light bar steel. Prior to the erection of this rack, this material was scattered around the floor of the machine shop, creating a very untidy appearance.

This rack is constructed of four L-shaped T sections spaced 4 ft. 2 in. centers and bolted to the floor. These T's are reinforced at the top by a ⅝-in. round steel bar 12 ft. 9 in. long passing through and welded to the web, about 1½ in. from the top. A piece of T-bar 10 in. long welded to the end of another 40 in. long forms the L-shaped support. Five L-shaped ⅝-in. diameter rods, 5¾ in. long, spaced 5⅝ in. centers, form the members for the support of the stored material. These supports are inserted in holes drilled in the web of the T's and welded.

This rack occupies very little floor space. It has been found very effective for the storage of this material and has assisted in maintaining a better shop floor appearance.

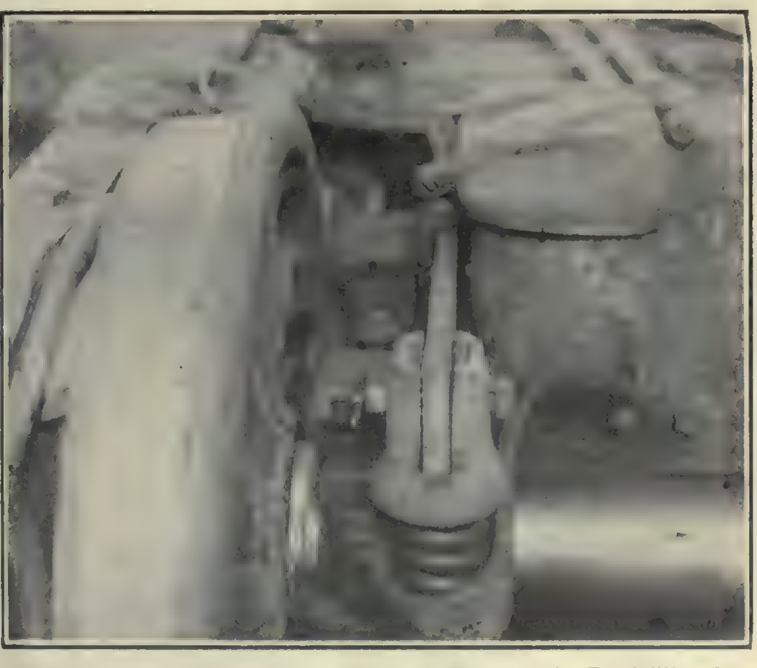
Axle-Bearing Flange Fitted to Truck

BECAUSE narrow-gage trucks are used on the Los Angeles Railway cars, there is no axle collar against which the axle bearing can be fitted. As a result it is necessary to fit the axle bearing flange to the gear on one side and wheel on the other, allowing the proper clearance.

In the truck shop, the motor is swung into its place, the pinion aligned with the gear, and then the gear end axle-bearing flange is trimmed to allow approximately $\frac{1}{32}$-in. clearance between it and the gear. The other axle-bearing flange is trimmed to allow $\frac{1}{32}$-in. clearance between it and the wheel at the commutator end of the motor. The size of each bearing flange is determined by calipering the space between the motor shell and the wheel or gear, as the case may be.

A machine to cut the flange of the bearing has been constructed and

A Machine Mounted on a Post in Los Angeles Railway Truck Shop Trims Off the Flange Face of Axle Bearing to Give It the Proper Clearance in the Narrow-Gage Truck

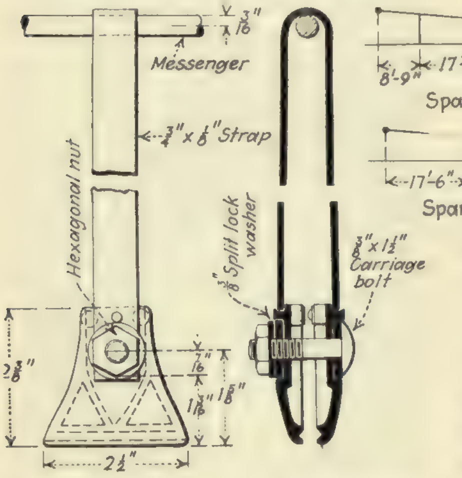


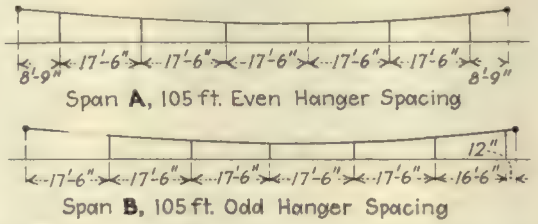
Close Quarters in Narrow-Gage Trucks Eliminates the Possibility of an Axle Collar. The Axle-Bearing Flange Fits Against the Gear at the Gear End of the Motor and Against the Wheel at the Commutator End. A Clearance of Approximately $\frac{1}{32}$ In. Is Allowed is mounted on a workbench in the truck shop. It consists of a clamping device for holding the two halves of the bearing and a U-shaped frame which has a spindle carrying the cutting tool at the end of an arm. The spindle is turned by hand through a single reduction spur gearing. One of the illustrations shows the construction of this machine. The cross feed is automatic, the tool arm being moved out of the spindle head by a feed screw, actuated by a five-pointed star pick-up, which on each revolution of the spindle strikes a lug, advancing it one point. A bin below the machine catches the waste metal, which is later reclaimed and put back into the babbitt pouring pot.

Double Catenary Insures Service

DOUBLE catenary suspension with a double trolley arranged as independent supply for pantograph operation is being installed by the Key System Transit Company, Oakland, Cal., on the 3½-mile double-track pier route between the mole, where the ferryboats connect with the cars, and the mainland at Oakland. This installation is entirely of copper and bronze. It replaces several types of overhead suspension used on this route, which is the bottleneck of the entire Key Route System. Failure of the overhead on this section of right-of-way means paralyzing the entire system. Therefore, it was decided to make the overhead construction of the best possible type and in duplicate so that mechanical failure of one line would not interfere with service.

The new trolley suspension is of the catenary type with a ⅜-in. composition bronze messenger supporting by bronze straps a No. 0000 Phono-electric trolley wire. The straps are of ¾ x ⅛-in. special bronze, fastened by bronze carriage bolts, lock washer and hexagonal nut to a trolley clamp which is designed for either wheel or pantograph operation. The two trolley wires of this construction are spaced approximately 6 in. apart, with the hanger spacing staggered to give odd and even spacing in the same span. The roller of the pantograph makes contact with both trolley wires, and as a result the mechanical failure of one does not permit the roller to fly up into the overhead. The two trolley wires and suspensions are tied together electrically.





Type of Trolley Hanger and Clamp Made of Bronze Which Will Be Used in Double Catenary Construction on Pier Line of Key System Transit Company. Use of Bronze Is Necessitated by Presence of Salt Air and Sewer Gases

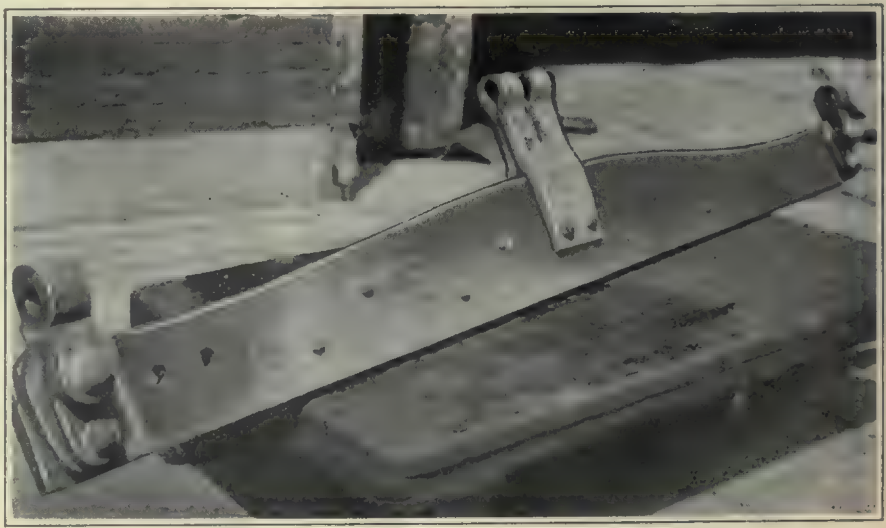
This type of construction, using bronze, is made necessary by the climatic conditions. Salt air and the sewer gas encountered, particularly on the flats, cause excessive corrosion of any metal other than bronze or copper. The old overhead line, with galvanized messenger and hangers, has only seen service for a few years, but now is considered unsafe for operation.

Brake Beams that Are Worn Where the Pull Rods Are Attached Are Built Up by Oxyacetylene Gas Welding

Welding Brake Beams to Make Good as New

BRAKE beams on all types of cars become worn at points where the pull rods are attached. The practice of the Grand Rapids Railway, Grand Rapids, Mich., is to build up the worn surfaces, fill in the holes and when redrilled the beams are as good as new.

Some of these are found to be worn to a depth of ⅜ in. The welding work is done with an oxyacetylene outfit and a welder can build up and fill in the holes of a brake beam in half an hour. Accompanying illustrations show where the wear takes place and a beam which has been repaired. This method of repair has proved effective in reducing noise.



Brake Beam Repaired by Welding Ready for Installation on Car

New Equipment Available

Small Size Electric Drill

BALL bearings and a removable gear on the armature shaft are features of an electric drill of ¼-in. capacity placed on the market by the Hisey-Wolf Machine Company, Cincinnati, Ohio. The gearing is made of high grade steel, electrically heat treated. The compound gear shaft is supported with bearings at each end.

Improved Construction of New ¼-In Universal Drill

The chuck spindle is hardened and ground and automatically lubricated through the gearcase. Brush-holders are provided with adjustable spring tension, mounted as a separate unit on a Bakelite yoke. The end handle cover is a rugged casting carrying all pressure applied and is independent of the motor and its bearings. This arrangement relieves them of all strain and also affords convenient access to the carbon brushes for adjustment or renewal.

Repairs made in time save pull-ins from the line.

Improved Unit Switch Construction

BY THE application of the type 480 mechanism to the 272 switch unit, which was made possible by the development of new arc chutes, operators are given the advantages of more modern construction in unit switches manufactured by the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.

The design of the type 480 mechanism is such that the contacts close with a rolling motion which eliminates wiping action. This mechanism uses a contact spring worked at a low fiber stress. The switch arm gives the mechanism better protection from arc gases and cast copper arc horns with a large cross-section of metal provide better dissipation of the heat of the arc. The use of the type 480 mechanism results in less frictional wear on the contacts, less burning of the contacts, arc horns and arc chutes and the practical elimination of finger spring breakage.

The new arc chutes are built up of asbestos lumber with sides and blocks made from a special arc-resisting molded material. The arc blocks are shaped so that they reduce the possibility of arc gases entering the switch mechanism. The complete arc chute is fastened in the switch box by one wing bolt, which permits removal with minimum effort.

In replacing old switch units, it is recommended that those in an entire group be replaced at the same time, preferably when the equipment is overhauled. Old switch units should be dismantled and serviceable parts placed in stock to be used to maintain the type 272 switch units which have not been modernized. As the stock of the old parts becomes low, additional equipment should be changed over. This permits modernization with the least confusion and lowest cost to the operator.

Welded Steel Shapes Used in Welding Framework

SUBSTITUTION of welded structural steel to replace gray iron castings for the 300-amp. "Stable-Arc" welder has just been announced by the Lincoln Electric Company, Cleveland, Ohio. The motor and generator end rings, brackets and connecting rings are all made of structural angles rolled up into the proper shapes and welded together. The feet of the motor-generator set are made of drop forgings. The truck wheels are of T-sections rolled on a special machine. The hub of the wheel is made of steel tubing. Control panels are usually made of slate or special non-metallic compounds, but the panel of the new machine is made of sheet steel welded together and welded to the supports.

The underlying idea in the adoption of this construction for the new welder is to meet the severe conditions which portable welding equipment must withstand. It is claimed that use of the steel construction, which will bend rather than break, reduces the liability of failure.

New Welding Equipment Employs Structural Steel in Place of Iron Castings

Association News & Discussions

Central Master Mechanics Meet in Toledo

Busy One-Day Session Devoted to Discussion of Brakes, Perfection of Standard Freight Car Specifications and Other Matters Which Would Facilitate Interchange of Equipment

PROGRESS in the work of bringing about greater uniformity of practice among interurban roads in the C.E.R.A. territory was made at a meeting of the Central Electric Railway Master Mechanics' Association held in Toledo, Ohio, on Feb. 2, immediately preceding the meeting of the parent association. Various phases of the work being done by this body to facilitate the interchange of freight equipment among the interurban lines in the central association territory were taken up for progress reports, discussion and further development. Car builders' representatives were present to discuss with the entire group questions in connection with the design and construction of the standard interurban box car, which was one of the early important accomplishments resulting from the work carried on since the organization of this association.

Crowded into the short space of a single day's session was a combination program consisting of papers by manufacturers' experts on subjects of direct interest to the equipment men, a conference and discussion on the work of standing committees and the customary inspection trip through the shops of the home company, in this case the Community Traction Company of Toledo. Air brake design and maintenance practices were covered in a paper on this subject by W. C. Horner of the Westinghouse Air Brake Company. This formed the basis for considerable discussion of brake inspection and maintenance methods. At the request of the association, this paper will be printed in complete form in an early issue of ELECTRIC RAILWAY JOURNAL so that it may be made available to all mechanical men interested in the subject.

AIR-MAGNETIC BRAKES DISCUSSED

Another subject which aroused a great deal of interest and discussion was that of air-magnetic brakes, which was presented by C. V. Ives of the General Electric Company. He covered particularly the form of brake developed co-operatively by the Buffalo & Erie Railway, the General Electric Company and the Cincinnati Car Company. In this design the magnetic brake is energized directly from the trolley instead of by regeneration of the motors. Magnetic brake equipments heretofore used, he explained, fall into three classes: (1) The solenoid brake, in which the armature of a solenoid transmits pressure to brake shoes on the wheels; (2) the disk brake, in which a disk keyed to the axle is retarded by a stationary disk, magnetically attracted to it; (3) the track brake, in which an electro-magnetically actuated shoe acts on the rail and is at the same time mechanically connected to wheel shoes through a system of levers.

In practically all former installations, both in this country and abroad, current for energizing the magnets has been taken from the car motors acting as generators. This method of deriving the power, according to Mr. Ives, afforded the outstanding advantage of the magnetic brake; i.e., the retarding force is automatically decreased as the speed of the car is reduced, thereby compensating for the increase in the coefficient of friction as the car speed declines. This characteristic tends toward uniform retardation without requiring any special skill on the part of the operator. On the other hand, the speaker held that the additional apparatus required and the additional size of motor needed represented inherent disadvantages of most former designs. Resistance banks were needed to limit the current to the brakes during the braking controller operations. Furthermore, when the car reached a stop and the motor armatures stopped rotating it was necessary to utilize the hand brakes to keep the car from moving.

COMING MEETINGS
OF
Electric Railway and Allied Associations

March 4—**American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p.m.**

March 8-10—**Oklahoma Utilities Association, ninth annual convention, Huckins Hotel, Oklahoma City, Okla.**

March 17-18—**Illinois Electric Railways Association, seventh annual joint convention, Hotel Abraham Lincoln, Springfield, Ill.**

April 26-29—**Southwestern Public Service Association, convention, New Orleans, La.**

May 31—June 1-2—**Canadian Electric Railway Association, annual convention, Winnipeg, Man.**

July 27-29—**Association of Equipment Men, Southern Properties, 12th semi-annual meeting, Atlanta, Ga.**

Oct. 3-7—**American Electric Railway Association, annual convention and exhibit, Public Auditorium, Cleveland, Ohio.**

With any form of wheel brakes, the rate of retardation is limited by the adhesion between the wheels and the rail. For that reason, Mr. Ives explained, the combination air-magnetic design is a development of value in making possible much quicker and shorter stops in emergency than are possible with air brakes alone. He cited the results of tests made on the Buffalo & Erie property and published in ELECTRIC RAILWAY JOURNAL for July 17, 1926, page 96, and Aug. 21, 1926, page 290.

USES TROLLEY CURRENT

Due to the use of direct trolley current instead of regeneration from the motors, the control of the air-magnetic design has been worked out in a very simple manner. The design is such that the magnetic track brake is automatically brought into play whenever an emergency application of the air brake is made. It may also be used for service stops (at the will of the operator) in case of a slippery rail, provided he has first made either a partial or full application of the air brake. The automatic feature is obtained by connecting a relay valve to the automatic sanding line of the standard safety car devices. This is used as a means of actuating the relay valve, which in turn admits air from the main reservoir to small vertical cylinders that push the magnet shoes down on the rail. At the same time reservoir air is admitted to a pneumatic contactor which connects the coils of the magnet shoes, through a fixed resistance, to the line. The service application feature is obtained by connecting the manual sanding pipe from the M-28 brake valve to the relay valve through a cut-off valve, the latter being open only when the straight air application pipe is under pressure. In the pipe between the brake valve and the cut-off valve a timing element, consisting of a small reservoir and vent plug, is installed so that the magnetic brake is held on for a predetermined time and is then released independently of the air brake. In any condition of operation, the magnetic brake is released with the release of the air brake.

Mr. Ives also spoke of the continued satisfactory performance of the brakes of this type which have been installed on the Buffalo & Erie property and also on the cars of the Kentucky Traction & Terminal Company. Reports on these properties indicate that maintenance costs up to date have been quite low. He said also that operators of cars equipped with the new brakes are given a sense of security in knowing that a quick stop can be made in an emergency, and that they can accurately judge service stops even under bad rail conditions.

Most of the proceedings during the business session consisted of reports of standing committees and discussions regarding their recommendations. Questions raised by car builders in connection with the specifications for the C.E.R.A. standard box cars were the subject of careful analysis. Other recommendations of the standards committee, of which T. H. Nicholl is chairman, occupied a considerable period of consideration and discussion. Recommendations were made by this committee regarding standards which it felt should become American Electric Railway Association Standards to be included in the Engineering Manual of that association. The committee also presented for discussion the design of a master inspector's gage and recommended that arrangements be made so that a number sufficient to provide at least one gage for each member property could be ordered from a reputable tool manufacturer in order that all rejections of cars passing over foreign lines would be in accordance with a standard gage. This was felt to be more than worth while as a means of avoiding controversy because of differences in the gages made up individually by the various properties.

New officers elected for the ensuing year were as follows: President, G. R. Green, general superintendent Chicago, South Bend & Northern Indiana Railway; vice-president, F. J. Foote, superintendent of motive power and equipment Indiana, Columbus & Eastern Traction Company. Charles Sigler, master mechanic Winona Service Company, was elected a new member of the executive committee. An invitation of the Westinghouse Air Brake Company to hold the next meeting of the association in Pittsburgh, so as to permit an inspection of the air brake plant at Wilmerding to be made, was accepted, and it was decided to make this a two-day meeting, the exact date to be set later.

The business session adjourned in the afternoon for an inspection of the shops of the Community Traction Company. During the noon-day recess all of the visiting master mechanics were entertained at luncheon by the local company. General Manager J. F. Johnson, Commercial Manager J. A. Greig and Master Mechanic W. A. Smith acted as hosts.

Higher Standards of Maintenance Will Improve Performance and Reduce Costs*

Modern Shop Machinery, Higher Grade Workmanship and Closer Tolerances Are Needed—Better and More Reliable Performance and Lower Ultimate Costs Will Result

By H. S. Williams
Assistant Superintendent of Equipment
Department of Street Railways, Detroit

Electric railway operations at present show the most alert and progressive spirit that has been manifest in a decade. The mechanical departments are feeling this and are devoting renewed study to maintenance problems. But actual improvement takes more than a decision by the equipment department to adopt higher standards; it requires that the idea be sold to the management and it is the underlying thought in the preparation of this paper to assist in this latter very necessary detail. The question that first arises before the manager is cost, and following that is its corollary —will the results justify the cost. If these two questions can be answered properly the result will or should be the acceptance of the plan. Higher maintenance standards mean slightly higher initial cost, but if intelligently applied will result in ultimate economies that will wipe out the first cost, produce continued savings and help give a more salable service to the public.

Let us examine for a moment the functions of maintenance. The first requirement is to provide for cleaning and sanitation, lubrication and adjustment of wearing parts. The second function is concerned with the detection of defective parts and their renewal before they cause difficulty, which aims at keeping the equipment in as nearly 100 per cent physical condition as is feasible. This requires foresight and regular inspection designed to anticipate possible trouble. In other words, let us call this preventive maintenance. Third, and of almost equal importance, is the study of the equipment and methods with a view to making improvements that will be economically beneficial and that will also increase the sales value of the ride.

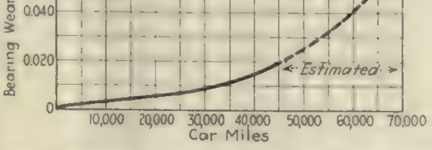


Fig. 1—Progressive Bearing Wear. Average of Tests of Sixteen Railway Motor Axle Bearings

It is not my purpose to dwell long upon the first element, though it may not be amiss to call attention to the unquestioned sales value of clean cars. People will not ride in dirty cars if there is any other means of transportation available. It is regrettable that it cannot be shown how many riders will be attracted to a car on account of its cleanliness or how many will be driven away because of its untidy condition. In a time like the present not only our own interest but the good of the communities which we serve demands that we win over the private automobile driver. But how is that possible if the seat, say of rattan, is bordered with a brownish discoloration and is only presentable where the passengers' clothing has cleaned off a part of the car seat; if the floor is littered with papers, transfer stubs, coin wrappers and dust drifts in every corner and out-of-the-way place; if the windows are streaked and dirty? It just cannot be done and the sooner we stop trying to cut the expense of car cleaning to the bone, the sooner we will help overcome the falling riding habit.

Preventive Maintenance Reduces Pull-Ins

As to preventive maintenance, we must lay especial stress on this item. Probably no one questions the economy of the principle. What is needed is more extensive use of means now within reach. A systematic, thorough, periodic overhaul program is or should be the goal of every equipment man. Failing in this, the next alternative seems to be the application of a periodic testing of car wiring, motors and all electrical equipment with high voltage in order that weak spots may be broken down at a chosen and opportune time. This results in lowered maintenance cost and improved service through reduced pull-ins. As a specific example of the effect of this practice upon pull-ins is cited the case of a road which adopted this practice in 1924 after an intensive campaign to reduce pull-ins. In this case the reductions are almost entirely attributable to the detection and repair of potential electrical failures before they caused road failures. The results are shown in the following tabulation:

COMPARISON OF PULL-INS FROM POWER CIRCUIT FAILURES AND BREAKDOWNS ON HIGH-TENSION TEST

Year	Pull-Ins per Thousand Car-Miles Due to Power Circuit Failures	Cost of Account 33 per Car-Mile	Cars Broken Down by Hign-Tension Test
1923	0.0647	0.0059	....
1924	0.0478	0.0044	216
1925	0.0257	0.0043	514
1926	0.0312	0.0042	1,101

It is to be noted in this tabulation that there is a slight increase in pull-ins in 1926, which is explained by an abnormal storm and flood. The increasing number of cars broken down by the high-tension test is explained by added facilities for making these tests and a more strict following out of the procedure. It will be seen, however, that the added breakdowns shown in the last column did not produce a corresponding increase in the cost of maintenance of electrical equipment.

Bearing Abuse Increases Cost

Perhaps one of the most abused elements of a street car is the motor axle bearing and there is no one item to which higher maintenance standards can be applied to better advantage. This is true because the condition of this bearing controls not only its own life but that of the motor gears. This being a sleeve type bearing, it is apparent that if it be maintained at a close fit, the only wear to which it will be subjected is frictional. So if the housing is properly designed to exclude dirt and if sufficient lubrication is provided, maximum life of the bearing will be obtained. However, if the original fit be loose enough to allow radial movement, if ever so slight, the bearing is then subjected to impact blows which are far more destructive than the frictional wear and consequently the rate of wear instead of progressing in even stages will increase at an accelerated rate. To illustrate, it is only necessary to compare this hammering action to the main or connecting rod bearings of the automobile engine. Every one is familiar with the action of these bearings and the fact that when well-fitted their life is relatively long. But let them become worn to the stage where hammer is apparent and you know how rapidly the wear accelerates to the destruction point. In order to make a definite application of this principle to the axle bearing and show exactly what happens in actual service on electric cars a series of tests has been run and accurate measurements have been made showing progressive bearing wear.

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*Abstract of paper presented before Central Electric Railway Association at Toledo, Ohio, Feb. 4, 1927.

Sixteen bearings of the solid bronze type were used in the test. The analysis of this bearing metal is: Copper, 79; tin, 8; lead, 8; zinc, 5. The bearings were new and were carefully fitted in their housings. All of them were tightly clamped in position and three sets of measurements of inside diameters were taken by inside micrometers. These measurements were made at either end and the center, so that liability to error was reduced as far as possible. To secure a range of motor sizes, the bearings were divided among 35, 50, and 70-hp. motors. At intervals, the motors were removed from the cars, the bearings clamped back in position and the inside diameters measured. This test has been under way for fifteen months, and while it has not been finished, sufficient data are available to show the tendency of wear and to predict its future trend with reasonable assurance. So far as could be determined, this is the first study that has been made of progressive bearing wear of motor bearings. A detailed record of all the data obtained to date would needlessly confuse this discussion, so the averages have been computed and are shown graphically in an accompanying illustration. Attention is called to the fact that the results from the various test bearings are remarkably consistent. This gives confidence that the results shown in the graph reproduced on the preceding page can be depended on.

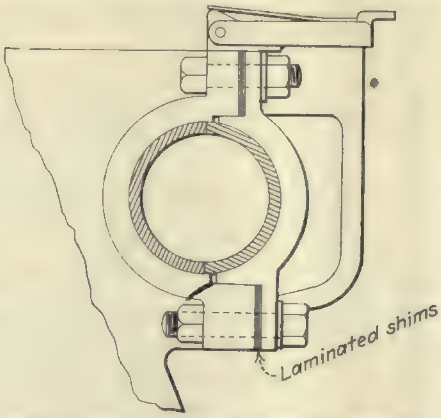

Fig. 2—Type of Railway Motor Bearing Tested

The important deduction from this test is the value of bearing mileage during the time that the bearing clearances are small, or, stated in another and more specific way, a bearing wear of 0.001 in. in the early stages of bearing life will give approximately ten times as much mileage as 0.001 in. of wear near the end of its life. This furnishes proof that loose bearings are not economical and that to secure maximum life the original bearing fit must be as tight as practicable.

Assuming agreement with the principle that loose bearings are not economical, what shall be done to maintenance standards to bring about greater life and economy? First, the outside surface of the bearing should be given more attention. The bearing should receive careful machining, to the end that when clamped in position the strains of the axle cap shall be uniformly distributed and that there shall be no distortion. Also the clamping should produce the strong vise-like action that will hold the bearing tightly in the shell and will eliminate dependence upon keys or dowels to keep the bearing from turning. Dowels were originally designed as locating means only, although the practice has gradually grown into existence of expecting them to hold the bearing from turning. In fitting of axle bearings the practice should closely approximate the fitting of connecting rod bearings of an automobile engine. The cap should have a clearance at its bolting lugs and this space should be filled with laminated shims. The intent of this may be understood better by reference to the accompanying illustration which shows the recommended method of fitting.

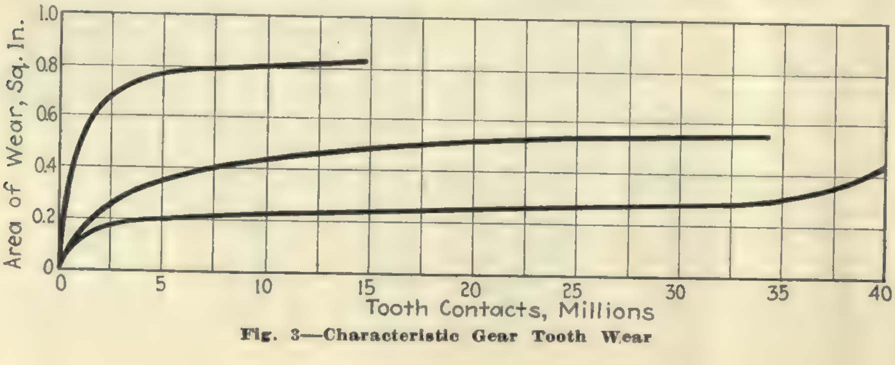

Fig. 3—Characteristic Gear Tooth Wear

SMALLER CLEARANCES DESIRABLE

As to the wearing surface of the bearing, it is believed that clearances may be made smaller with profit. To do this the bearings must not only be individually fitted to the axles, but it is contended that the finish fit must be a line-reaming operation. If you will check the alignment of surfaces of newly prepared bearings when clamped in position but without the axle in place the necessity of this will be readily apparent in most cases. A line-reaming operation is not necessarily a difficult nor complicated thing if properly approached. It is estimated that it will add not more than $1.75 to the cost of one motor overhaul while the value of added life should run to many times this cost.

Present standards call for an axle-bearing clearance of 0.015 in. to 0.017 in. Every thousandth that can be saved in original fitting means approximately 5,000 miles added to its life. With careful machining the clearances may be reduced to 0.010, or 0.007 in. less than present practice. This, it is predicted, will add 35,000 miles to the bearing life, which will certainly justify the added cost of higher standards of machining previously mentioned. The next step that logically follows is to apply the line-reaming operation to armature bearings, though the results from this will not show results proportionate to those obtained from axle bearings.

BEARING WEAR AFFECTS GEAR LIFE

As stated previously, bearing wear has an important effect upon the life of gearing. Loose bearings will superimpose the element of hammer blow upon the normal frictional wear in exactly the same manner as pointed out in the case of axle bearings. A third element of wear is injected into the case when bearing wear is such as to permit a spreading of gear centers, although this is the least important factor. This is contrary to the commonly accepted view, but it is a fact that if the tooth form is correct and the mounting of the gearing is solid, that is, that the bearings are not worn, the effect of spread centers has little effect on the efficiency of the involute gear. Of course if the teeth are badly worn, another set of conditions is introduced and the normal wear will be excessive.

Spreading centers of correct gears changes the pressure angle. This results in increased tooth and bearing pressures and concentration of wear over a smaller area of the tooth. To show the exact effect of this, the change of pressure has been calculated for the spur gearing of a modern 35-hp. motor with a 20-deg. pressure angle. If the bearings on this motor allow the gear centers to spread ¼ in. this changes the pressure angle but 2.2 per cent. This means that tooth pressure and bearing pressure due to gears is increased only 2.2 per cent. This naturally results in increased wear, but the increase is not sufficient to cause alarm if bearings are tight. Such, however, is not the case in practice because the thing that causes spread centers is worn bearings. As in the case of the bearings themselves, this looseness allows vibration and consequent hammer blow on the gear teeth with a resultant wear far in excess of normal frictional wear. The exact loss of life due to the hammer blow is difficult of determination. It could be evaluated only after a long series of practical tests. However, it is predicted that the probable wear characteristic will resemble the form of curve shown in Fig. 1.

Now let us examine the other side of the picture and see what would happen to the gear life if the bearings are kept tight. Recently an exhaustive investigation of gear life was made by the University of Illinois. This included careful records of progressive wear. From the data secured in these tests computations have been made to show the characteristic wear of gears. Of course the tests referred to were not made upon railway gears, but the tooth form was the same and pressure angles used were 14½ deg. and 20 deg. Fig. 3 shows the results for several combinations. From this it will be seen that wear occurs rapidly at first but slowly toward the end of its life. Just previous to the finish of the test, the wear curve shows an abrupt rise. The value of these data is to show the tendency of gear tooth wear under good conditions or what the characteristic wear will be if bearings are kept tight. If bearings are loose then the wear curve will not flatten off as indicated in the accompanying diagram, but will continue its abrupt rise and probably following the characteristic of the curve shown in the illustration.

Tight Bearings Mean Less Noise

Having shown that it is highly economical to keep bearings tight, let us look at another view of the question. We are all endeavoring to reduce noise in car operation. Loose bearings and worn gears are one of the greatest sources of noise, so high maintenance standards in these cases will do more to eliminate noise than any other single line of action. It may be argued that as long as we have to depend upon spur gearing or a low angle helical gear we will have noise. If present methods of gear cutting were the only ones in sight, this might be admitted, but fortunately such is not the case. Gearing is inherently quiet. It is inaccuracy of cutting that makes noise. It is predicted that within two or three years we shall be able to secure gears whose inaccuracy will be measured in ten thousandths of an inch instead of thousandths. With the advent of such gearing, we shall be able to obtain results in quietness hitherto deemed impossible. So it behooves us to bring up our standards of bearing maintenance to such an extent as to take full advantage of this perfected gearing when it arrives.

It is manifestly impossible to take up all of the details of car maintenance to which higher standards may be profitably applied. However, the line of reasoning developed in the cases which have been discussed applies to practically all wearing parts. It must not be thought that the advantages to be gained by the introduction of higher standards of maintenance can be obtained without cost. Far from it. First, it will undoubtedly call for an investment in machinery. If present machines are not in first-class condition and capable of doing accurate work they will have to be replaced. Special tools will have to be provided. Second, and more difficult, the mechanics will have to be trained to accommodate themselves to the new requirements. The ultimate savings which are bound to accrue will not be apparent until considerable time has elapsed. In other words, if a car is now overhauled on a basis of eighteen months and by improved methods this period can be extended to 24 months the savings will not be manifest until the eighteenth month. Consequently the adoption of such a plan requires foresight, confidence and courage. It is unthinkable that we should be content with present practices, because that would be to assume that perfection has been reached.

Modern Production Methods May Be Applied to Maintenance Work*

Introduction of Labor-Saving Machines and Time-Saving Methods Are Possible in Many Maintenance Operations—Workman Morale Must Be Built Up to Secure Results

By W. T. Rossell
General Manager Pittsburgh Railways

TRUE economy is what we are seeking. Better maintenance or less cost, or both, means cash, which can be used in any way we see fit. There is a close analogy between all forms of work. Whether we are maintaining cars or track or overhead lines, the underlying principles are the same.

If we look back ten years, improvement in methods is obvious. The same will be true ten years hence. We can hasten this change, but first we must admit honestly to ourselves that our present methods are not the best. We pride ourselves on the accumulation of knowledge the value of which sometimes passes as we acquire it. Experience may become an actual burden as it is always based on the past, whereas we must live and work in the future. It is not desired to belittle knowledge and experience, but to keep them to their proper functions. They are tools, nothing more. A machine or unit of equipment, crystallizing knowledge and experience as it does, becomes a liability as soon as further improvements are developed. So it is with the mind if we fail to seek new ways.

Some one has said that mental attitude is more important than mental capacity. Courage to act according to our convictions and courage to asume full responsibility for our actions is needed. Much of our progress is necessarily through trial and error. Analyze the maintenance problem—there are five definite parts: Supervisory force, workmen, machinery, materials, design. In addition there is a flexible force which pervades the whole. It is method or organization and it determines and controls.

Management Fixes the Viewpoint

The supervisory force includes all who do not do the actual work. It is obvious that the mental capacity of these men from top to bottom is but average and is beyond control. Their mental attitude, however, can be controlled. Justice, opportunity, security, ambition, interest, vanity, all play their parts. Each man has but to recollect his past to understand. Here is the part of management. The subject is too wide to attempt a complete exposition. Favoritism, nepotism and harshness must go. Each must feel that he is judged solely on merit. We must "know no difference of race or creed." There must be a similarity of opportunity in different departments and groups. This is obtained through the plant of organization and the method of promotion. Wherever we find a position without opportunity, there we find a discontented man. See to it that the curve or per cent of opportunity is favorable to all. The individual must feel that if he performs well his position is secure. Due consideration must be given to the humanities, the ambition, the interest, the vanity of the individual. In a word the morale must be high. Here again is the part of management. Now, with a high morale, we must somehow keep all of these men discontented. One of the masters has called it divine discontent.

Through discontent comes progress. They must be discontented with methods and results. They must feel that each process can and must be improved, that each improvement is but a step toward a distant goal. This feeling must reach each one and the utmost freedom of thought and discussion must prevail. Any man's ideas are worthy of respect.

Each man in the supervisory force must be given a definite part and his title should so state. There should be no "assistants." An assistant is usually either a messenger boy or a member of the department office who does all the work, depending on the nature of his chief. Initiative and courage and self-assurance should be developed by judging results and not separate acts. Fear of criticism by superiors is a creeping paralysis which stifles all progress. Petty interference will do the same. We must recognize and overcome the tendency, which all have, to become satisfied, to get in a rut, to cease struggling, to let well enough alone.

In the case of workmen we may

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*Abstract of paper presented before Central Electric Railway Association, Toledo, Ohio, Feb. 4, 1927.

expect only the average. But the morale may be raised to the heights. All that has been said of the supervisory force is equally true of the workman. See that he understands what is being done and why. Encourage and praise him if he is doing well and talk frankly to him if he is not. Above all, see that he has a proper amount of work to do and that his work is geared to that of others. This gearing of one man's work to that of others brings a proper pride and feeling of responsibility that will cure much indifference and idling. If work slows down, it is quickly shown who is at fault and how.

LABOR-SAVING MACHINERY ELIMINATES DRUDGERY

Upon the introduction of labor-saving machinery depends much of our hope. The elimination of drudgery and the raising of the productivity of the individual will come about more through the use of machinery than in any other way. Both selfish interest and common interest call for the use of more and more machinery.

For proper maintenance results, materials should be of proper quality of course, and the utmost care should be taken to assure this. Even more important, however, the flow of materials to the work should be regular and ample. For mass production this is essential. An investigation of the methods of leaders in manufacturing will convince any one of this. A shortage even of unimportant items may prove very costly.

In general, we inherit design and must make the best of it. It is usually very faulty as it is of the past. We may cure minor and glaring faults slowly, but in general we cannot greatly change the equipment on our hands. However, we can and should call the attention of manufacturers to faults. In general, it is the duty of manufacturers and not that of operators to improve design.

ORGANIZATION INCREASES PRODUCTION

It is through method or organization that we may attain what is known as mass production. Its application to maintenance differs from its application to manufacture only because the former is partially repetitive and the latter is entirely repetitive. This gap is bridged by three steps: First, the unit to which the repairs are made is separated from the whole and then dealt with as a complete unit; second, pools of assembled units, partially assembled units and separate parts are maintained and located between each work step and the next; third, the repair is made rather complete, that is, parts are replaced which still have some life.

This last rule covers both small and large units and may be called the overhaul method. All of these processes, however, still lack some of the efficiency which may be attained in manufacturing where exactly the same thing is done over and over.

Now, we have many examples of what to do. A spy tells me that the Ford plant is well worth investigating.

Broadly, we are endeavoring to obtain satisfactory results with as little work as possible. The mechanical equation of work is — force × distance = work. It is obvious that the only way to decrease work is to decrease force or distance or both. Consideration will show us that cost of force varies greatly and that the equation may be restated. Cost of unit of force over unit of distance × force × distance = cost of work.

The cost of a unit of force over a unit of distance at once suggests cranes, tractors, grinders, and other machinery of all sorts. It also introduces the economic problems which go with the use of machinery, such as its utmost use, depreciation, etc. It is usually cheaper to apply a greater force once than to apply a lesser force many times. So we get mass handling of material. Specialization is also suggested as different grades of labor differ in cost. There are ways of reducing the amount of force through more efficient machines and better lubrication. Improved methods of using levers, wrenches and other tools by workmen will also reduce this factor.

The reduction of distance leads the way to centralization, specialization and routing of work, materials and tools. When a workman lifts or sets up a tool, performs one operation and then goes to something else, the lost motion becomes obvious. Examples are all about us, and if we have builded our organization well and will keep its aims high, we cannot fail in our purpose of applying modern production methods to maintain work.

Illinois Association to Meet March 17-18

ILLINOIS Electric Railway men will meet jointly with the state gas and electric associations at the eighteenth annual convention to be held on March 17 and 18, at the Hotel Abraham Lincoln, Springfield, Ill. According to an announcement by Secretary E. V. Prather, the Central and Western Passenger Associations have granted reduced fares—1½ fare for the round trip —over all steam roads in the state, and this same reduction has been made by the Illinois Traction System. He also suggests that hotel reservations be made direct with the hotel.

Papers to be presented before the electric railway association are as follows:

"Traffic Regulation and Relation to Street Car Operation," by E. J. McIlraith, staff engineer Chicago Surface Lines.

"Track Maintenance," by Jonathan Wolfe, assistant supervisor of track and roadways Chicago Surface Lines.

"Handling L.C.L. Freight by Truck vs. Railroads."

"Advantages to the Public of One-Man Car Operation in City Service," by R. F. Palmblade, manager Peoria Railway.

"Car Construction," by M. J. Oswald, sales representative St. Louis Car Company.

"Bus Maintenance," by H. P. MacDonald, superintendent of automotive equipment East St. Louis & Suburban Railway.

There will also be two morning joint sessions on public relations, finance, terminable permits and public utility information.

Automotive Engineers Discuss the Bus

THE place of the motor bus in urban transportation was the subject of a meeting held by the Metropolitan Section, Society of Automotive Engineers, in New York on the evening of Feb. 17.

Speaking with a background of more than five years experience in bus operation, R. N. Graham, manager of railways Pennsylvania-Ohio Edison Company, presented a carefully prepared analysis of the part the motor bus may be expected to play in the transportation scheme of the country. Mr. Graham spoke not as a railway man, but as a transportation man interested in finding the place of each form of vehicle which is available for transportation purposes. An abstract of his talk will be published in next week's issue of the JOURNAL.

Both automotive and electric railway men took part in the discussion. Adrian Hughes, Jr., manager Baltimore Coach Company, said that progressive transportation men today have no prejudice against the automotive vehicle. If there was such prejudice when the bus first made its appearance, the speaker explained, it was the natural result of the unfair conditions under which a great many original competitive bus lines were started. He held to the view that the application of buses as a part of the transportation systems of modern cities should be dictated by the economics of each situation. He said that the study of the matter of how best to use the motor bus, and the analysis of the factors which determine the proper vehicle to use under each given set of conditions, is considered by progressive transportation men to be one of the major problems of the industry.

Gas-electric drive for buses, effect of power brakes on tire wear and one-man operation of double-deck vehicles were phases of the subject discussed by other speakers.

American Association News

T. & T. Executive

PROGRESS reports of committee chairmen occupied the greater portion of the time at the meeting of the executive committee of the T. & T. Association held in Toledo, Ohio, on Feb. 4. R. N. Graham, chairman of the committee on bus operation, indicated substantial progress of the work which has been undertaken. S. E. Emmons reported on the work of the service betterment committee, in which much new work is being undertaken. In the absence of Chairman C. H. Evenson, Samuel Riddle reported on the work of the traffic and safety committee, which is being conducted jointly with the claims association. This committee recently reviewed the conditions of the Anthony N. Brady Award and agreed with Chairman Thomas Fitzgerald of the American Association committee on a revised set of conditions to be offered to the American Association and the American Museum of Safety. A sub-committee was appointed to co-operate with the electric railway section of the National Safety Council in preparing a revised classification of accidents.

President Sullivan appointed two new committees. The one on convention program consists of W. H. Boyce, chairman; Paul Wilson and A. R. Myers. In addition to preparing the program for the T. & T. Association, this committee was also instructed to get in touch with President Proctor of the Claims Association regarding arrangements for a joint session for the presentation of the report of the joint committee on traffic and safety.

A committee on subjects for next year's work was also appointed, consisting of Edward Dana, chairman; Samuel Riddle and G. B. Anderson. This committee is to consider the results of this year's work and make recommendations for the work of the committees for next year, also taking into consideration whether committees on entirely new subjects should be appointed and some of the present subjects dropped.

It is planned to have the next meeting early in July after the reports of the standing committees have been presented. The date and location will be announced later.

President Sullivan appointed a committee on resolutions on the death of E. M. Walker, late president of the Schenectady Railway. This committee, consisting of Paul Wilson, Edward Dana and Samuel Riddle, was instructed to draft suitable resolutions and submit them for presentation at the convention and inclusion in the Proceedings. A letter of appreciation from Mrs. Walker for the floral tribute sent by members of the committee was read.

Those present were President J. V. Sullivan, Edward Dana, W. H. Boyce, Samuel Riddle, A. R. Myers of the executive committee; Committee Chairmen S. E. Emmons, R. N. Graham, and J. W. Welsh and G. C. Hecker.

Depreciation

POSTPONEMENT of the Interstate Commerce Commission hearing scheduled for Feb. 28 on depreciation, Docket No. 19157, until May 23, 1927, was obtained by Lucius S. Storrs, managing director of the American Electric Railway Association. This change was announced to the sub-committee on depreciation of the national relations committee at a meeting held in New York, Feb. 17, 1927.

Electric railways which report to the Interstate Commerce Commission will be interested in the course events are taking with respect to the impending order of the Interstate Commerce Commission in the matter of entering an order prescribing a system of depreciation accounting for electric railways substantially the same as that entered recently with respect to depreciation charges of steam railroads. Before considering the proposed order it was the idea of the commission to hold a hearing on Feb. 28 at Washington, D. C., before Examiner Bunton, at which those concerned were to have an opportunity to testify.

It was decided that the committee would present the case of the electric railways showing that the situation of the industry was essentially different from either the steam railroads or the telephone systems. Only a few of the electric interurbans and still fewer city systems come under the Interstate Commerce Commission jurisdiction. The assumption is, however, that many state commissions may follow the example of the Interstate Commerce Commission if the national commission should promulgate this change in the depreciation system. The committee recognized the isolated character of electric railways. This and the widely different conditions of finance, earnings, and competition with automobiles was considered of such importance that no standard rule of depreciation could be made effective with justice to all.

The committee outlined a program to collect data and prepare a comprehensive study of the industry. Obtainment of outside counsel to help present the case scheduled for May 23 was agreed upon.

Those of the committee present were: J. H. Hanna, chairman; Thomas Conway, Jr., F. W. Doolittle, W. F. Ham and C. R. Mahan representing C. E. Thompson. In addition Charles L. Henry, Lucius S. Storrs, J. W. Welsh and other members of the association staff attended.

Education

IMPORTANT plans were approved for further development of foreman training and study of the training of platform men at a meeting of the American Association committee on education, held at Toledo immediately after the annual convention of the C.E.R.A. This meeting followed correspondence among the committee members as to the best procedure for the current season and it proved successful in bringing out constructive suggestions.

In attendance at the meeting were these committee members: Edward Dana, chairman; H. H. Adams, W. H. Boyce, F. H. Miller, H. H. Norris and A. J. Sarré. M. B. Lambert was represented by A. B. Gibson and J. A. Dewhurst by Charles Gordon. Guests present by invitation included J. W. Colton, Prof. D. D. Ewing, E. P. Waller and Adolph Schlesinger, all of whom have shown keen interest in the work of the committee.

Discussion on the foreman-conference movement showed a lively interest on the part of railway managers and the need for some definite plan for training foreman-conference leaders. The series of conferences preceding the demonstration at Cleveland was believed to be a step in this direction. The subject is so large, however, that it was referred to a sub-committee, as follows: Mr. Dewhurst, chairman, and Messrs. Lambert, Boyce and Sarré. This committee will consider all possible methods of training, including the holding of a series of training conferences at the Cleveland convention this year. If such a series is planned it is understood that the sessions will occupy only a half day each.

The training of transportation employees was taken up in some detail, with the result that a sub-committee on this subject was appointed also. Dr. Rowland will be chairman, and Messrs. McCants, Adams and Hyatt will complete the committee. This committee will report on the general situation in this field with the possibilities of effective work in the field by the committee.

A third sub-committee was appointed to bring about greater publicity for the educational work of electric railways. The committee comprises Mr. Norris, chairman, and Messrs. Boyce, Dewhurst and Burke.

It was deemed necessary this year to send out a questionnaire to gather facts on educational activities in the industry, but this will be so worded as to call for a minimum of time in the compilation of the replies. The committee will also bring up to date the bibliography on educational work which formed an appendix to the report for last year.

In the interest of conservation of time and energy at the disposal of the committee it was decided to omit the educational exhibit at the 1927 convention and to concentrate upon the phases of the work assigned to the sub-committees named. As a guide to future activities a chart will be prepared showing the ramifications of educational and training work on an electric railway property. Thus the committee this year and later will have a guide by which to prepare its plans, taking up at one time only those lines of work that are timely and promising.

Bus Operation

GENERAL discussion of various phases of operation was participated in by the members of the committee on bus operation of the T. & T. Association at its meeting held in Toledo, Ohio, on Feb. 3. A check-up was made of the replies to the questionnaire which was sent to 51 companies. It was found that nineteen companies had been heard from. It was decided that the chairman would follow up the members responsible and attempt to get the data all in within the next two weeks.

Progress was reported by the sub-committee chairmen on the four subjects which are being studied. Much of the work is awaiting the tabulation of material from the questionnaires.

It was decided to hold the third meeting of the committee in Chicago, Ill., on April 8 at 9 a.m. Central Standard time, the meeting place to be arranged for by B. W. Arnold.

Those present at the meeting were Sponsors Paul E. Wilson and A. R. Myers, Chairman R. N. Graham, D. L. Fennell, S. W. Greenland, M. L. Harry, Adrian Hughes, Jr., D. S. Mackay, Thomas Noonan and D. A. Scanlon, members, and G. C. Hecker, R. E. Plimpton, W. W. Holden, C. D. Smith and R. F. Palmblade, guests.

The News of the Industry

$750,000 for Rehabilitation in Phoenix

The City Commission of Phoenix, Ariz., has unanimously approved an ordinance calling for a special municipal election on March 12, at which the public will be asked to approve an issue of bonds totaling $750,000 for the purchase of new cars, rails, ties and other necessities for bringing the present municipal railway up to date. The ordinance calls for the rehabilitation of the entire system, including the Washington Street, the Brill, the Indian school, the Grand Avenue, the Kenilworth and the Hollywood lines.

The ordinance adopted by the commission asks approval of the issuing of 750 bonds of a denomination of $1,000 each. The bonds are to bear interest at a rate not exceeding 5 per cent per annum, payable semi-annually, maturing at the rate of $30,000 annually, over a period of 25 years beginning in 1932. Under this plan the system will be operated for a period of five years before the sinking fund begins to operate.

Parking Regulations in Philadelphia Opposed

Hardly had the enforcement of the new parking regulations in Philadelphia been in effect when a demand was forwarded to the Mayor and Director Elliott for their modification. In a set of resolutions the Market Street merchants asked for half-hour parking, claiming that the restrictions are driving trade away. So far has the protest gone that an ultimatum was delivered to the city administration on Feb. 11 by the Market Street Merchants' Association stating that unless the parking ban on Market Street was modified the association would file an injunction demanding enforcement.

In response Director Elliott has told the Market Street Merchants' Association that he would fight all attempts to modify the anti-parking ordinance until it has had a fair trial. His attitude met the approval of several traffic organizations and officials, including the traffic committee of the Chamber of Commerce and Kane S. Green, president of the Automobile Club of Philadelphia. Director Elliott told the representatives of the association that he would make no change in the regulations until all the "no parking" signs had been erected and the ordinance had received a reasonable test. Then he and Superintendent Mills would report to the City Council.

When the parking bill was signed the warning signs were still in preparation. Under the ruling of the court these signs are a necessary preliminary to the enforcement of the rule. The recent parking regulations have been referred to before in the ELECTRIC RAILWAY JOURNAL.

The latest move on the part of the Market Street Merchants' Association was the drafting of a parking bill on Feb. 15, the third ordinance since the anti-parking dispute. Two of the ordinances providing for restricted parking in the central city district were introduced in the Council on Feb. 17. Director Elliott refused to comment other than to say that enforcement of the parking ban was uppermost in his mind.

One-Man Car Right Sustained

Toronto Transportation Commission Wins Point Over City's Complaint—Review of the Situation in Canadian City—Amalgamated President Defends New Equipment

BY JUDGMENT of the Ontario Railway Board, the application brought by the city of Toronto to restrain the Toronto Transportation Commission from using one-man cars has been dismissed with costs. The decision was based upon an investigation conducted by its officers which resulted in the finding that accidents occurring with one-man cars could not have been prevented by the two-man type. Vice-Chairman Ingram said:

> If the people of Toronto are dissatisfied with the one-man car it is their duty to present their feelings to the Transportation Commission. It has not been shown that there have been accidents due to this type of car, and that is the only phase in which we are interested.

During the hearing of the application it was contended by Controller MacGregor that the opinion of the City Hall was unanimously in favor of the removal of the one-man cars. This statement, however, was sharply challenged by I. S. Fairty, K.C., counsel for the Transportation Commission, who stated that Controller MacGregor did not represent the unanimous opinion of the City Council, and could not get such a motion through if he wanted to. Mr. Fairty objected to statements made by Controller MacGregor during his election campaign, characterizing these as "reckless and wild."

Mr. Fairty declared that it would have been much more sporting for the city to have gone to the Toronto Transportation Commission and asked it to abandon the one-man cars than to apply to the board. He regretted that much election propaganda had been spread on the question. The commission, he said, had spent thousands of dollars in remodeling cars with the approval of the Board of Control.

CONTROVERSY IN MONTREAL

Agitation in Canada against the use of the one-man car was not confined to Toronto. The Montreal Trades and Labor Council's objection to the one-man cars was expressed in a resolution passed on Nov. 4. A copy of the resolution was sent to the Montreal Tramways management, accompanied by a letter which said in part:

> We hope you will give the resolution deserved consideration, as this is a vital question in the interest of the Montreal public, and, as a public body, we would like to have an opportunity to discuss this question with your company.

Julian C. Smith, president of the Montreal Tramways, replied in part:

> We believe that further study of the situation will convince you of the material benefits which the community gains through the operation of the one-man cars. We will be very happy to discuss the situation with you, and if you will advise me when it will be convenient to meet yourself and any other representatives of the Montreal Trades and Labor Council at the tramway offices, I will be glad to arrange to have with me some of our people who can discuss intelligently the features of the one-man cars that you refer to.

The Trades and Labor Council also sent its resolution to the Montreal Tramways Commission, and it received a letter from the commission about the same time as it received Mr. Smith's. The Trade and Labor Council considered these communications, and one-man car operation generally, at a meeting late in Nov., 1926, and reports indicated that the discussions were, in the main, far from harmonious. It was decided that no delegation should be sent to consult with the tramway management, on the ground that the company is not a controlling body, and that action to be taken on the commission's communication should be left to the Council.

The Trades and Labor Council's president, Mr. Foster, was very critical of the tramway union. It was a strange thing, he said, for the tramway union to denounce one-man cars and ask the T. and L. Council to do the same and then send a delegation on a tour to determine if its criticisms were correct. He felt that the union might have made sure that one-man cars are undesirable before asking the T. and L. Council to go on record against them.

Julian Smith, a few days later, stated that the protests against one-man car operation had been made before the equipment had been given a fair trial. He said that the fears held by labor that one-man car operation would reduce employment were groundless and pointed out that the fact of one-man cars constituting 30 per cent of the street cars operating in North America would indicate that they had merit.

He said the company had no desire to force on the public something it does not care to engage in any controversies.

not want, and that the one-man cars were introduced solely in keeping with the company's policy to give the public the best service possible.

G. Gagnon, president of the Montreal Tramways Employees' Union, was unable to accompany the delegation appointed to inquire into one-man operation in other cities and was replaced by R. Trepanier. Messrs. Trepanier, Champagne and Manion visited Detroit, Toledo, Cleveland, Pittsburgh, Trenton, Youngstown, Elizabeth, Scranton, Newark, New York, Bridgeport, Philadelphia, Albany and Troy in the latter part of November and their report was considered at a union meeting on Dec. 1.

It stated that one-man car operation was practically universal in all the cities visited, and of even greater importance, it indicated that informed people everywhere, inside the electric railway and outside of it, are convinced of the desirability of one-man cars and of their safety and economic value.

In Detroit the delegates met W. D. Mahon, president, and W. B. Fitzgerald, vice-president of the Amalgamated Association of Street and Electric Railway Employees of America, who impressed upon them their view that the one-man car is a modern development and a natural outgrowth of the march of progress; that its coming was inevitable, and that controversy in regard to its use has been settled by the courts in its favor, and, finally, that one-man car operation has not been injurious to the employees' interests.

The delegates suggested to Mr. Mahon that possibly the Montreal Tramways was violating the contract with its employees in placing one-man cars in operation, but their attention was called to a clause in that contract stipulating that one-man car operators are to be paid 5 cents an hour extra, implying that when the contract, all the conditions of which the men accepted, was entered into, operation of one-man cars had been in view.

The union's chief executives acquainted the delegates with the fierce competition electric railways have had to face, and with the fact that one-man cars constitute one of the best weapons the electric railway management have to meet that competition and hold their traffic. It is probable that at the end of the interview the delegates had come to a realization of the fact that the one-man car is just as beneficial to the electric railway employees, as a class, as to any one else.

Japanese Railway Representative Visits America

Gitaro Ishida, assistant to director of the Japanese Government Railways, Kobe region, is making a tour of the United States to study transportation methods more particularly in the electric railway and bus fields. Arriving in California on Nov. 14 he spent a week making observations in San Francisco and a month in Los Angeles and its vicinity. He is now in New York and will remain there until Feb. 20, when he will depart for a visit to various Western cities. He plans to see Philadelphia, Cincinnati, St. Louis, St. Paul, Minneapolis, Chicago, Detroit and Cleveland.

Hearing in Oakland Postponed

Pending the completion of an inventory and valuation of the company's properties, the hearing on the application of the Key System Transit Company for adjustment of rates was postponed on Feb. 1 by the California Railroad Commission until May 10. It is expected that the valuation survey will be completed by April 15, thus giving the experts time in which to check over their figures.

This valuation is of Dec. 31, 1926. It is based on unit prices over a three-year period ended June 30, 1926. In addition to a reproduction cost at new and at present values and a reproduction cost new less depreciation, a historical reproduction cost value will be made.

At the Feb. 1 hearing in Oakland, Herman Phleger, counsel for the Key System, filed a report which showed that despite a temporary increase in revenue granted by the authority of the Railroad Commission on Dec. 31, 1925, the additional revenue has fallen short of expectations.

When the 7-cent railway fare and the 21-cent ferry fare were officially authorized it was estimated by experts of the Railroad Commission that the company would require $800,000 additional revenue in 1926 to obtain the finances necessary to make improvements and to cover the $400,000 wage increases.

Mr. Phleger, in his report, pointed out that the revenue of the company in 1926 exceeded that of 1925 by $277,000 and that bond interest paid in 1926 exceeded that paid in 1925 by $125,857. During 1926 the company spent $4,549,196, made up as follows: Cars, $940,646; automotive equipment, $198,901; boats, $1,794,977; service equipment, $99,436; way and structures, $1,515,235.

The money for these improvements was obtained through the issue of the following securities: First mortgage 5½ per cent bonds, $2,500,000, an annual charge of $137,500; first mortgage 6 per cent bonds, $1,500,000, an annual charge of $90,000, and equipment trust 6 per cent bonds, an annual charge of $93,500.

The company is proceeding with the formulation of plans for changes in its pier, the report declares, and its officers are conferring with the city of Oakland regarding the making of a solid fill, but in view of increased operating costs in 1926 and the insufficient increase in revenue it has not been possible to do any work on the pier "and it will not be prudent to attempt to do so until the finances of the company are in better condition."

The two new ferryboats now in course of construction at an Oakland shipyard will be ready for service early in March.

Pennsylvania Railroad Talks of a Future Power Plant

An announcement made at Philadelphia by the Pennsylvania Railroad on Feb. 10 said that conferences had been held between the officials of the Pennsylvania Railroad, Philadelphia Electric Company, Philadelphia Rapid Transit Company, Public Service Corporation of New Jersey, Philadelphia Suburban Gas & Electric Company and Counties Gas & Electric Company (the latter two being subsidiaries of the United Gas Improvement Company) looking toward the construction of a power plant of sufficient capacity to provide for the rapidly increasing needs of these properties, especially for 25-cycle energy. In printing this announcement the newspapers said that the site of the plant would probably be on the Delaware River near Trenton, N. J.; that it would cost about $10,000,000, and that the power generated would be applied in extending the electrification of the Pennsylvania Railroad. Contradictory reports concerning the conferences, however, at once followed, the Philadelphia Electric Company and the Philadelphia Rapid Transit Company denying that they had taken part in such negotiations. A five-year contract between the Philadelphia Electric and the Philadelphia Rapid Transit for the supply of power to the latter will expire in the spring.

Status of Winnipeg Franchise

There have been no new developments in the Winnipeg electric railway franchise situation. The City Council had the right under the original contract made 35 years ago to take over the system in 1927 at its physical value by giving the company six months notice of its intention to do so. Such notice would have had to be given not later than Aug. 8, 1926. The City Council failed to give this notice and consequently the franchise is automatically extended for five years dating from Feb. 8, 1927. The right of the city to take over the system recurs every five years from now on.

New Ticket Rates in Tacoma

Tickets good for six rides, with transfer privileges, on all lines of the Tacoma Railway & Power Company, Tacoma, Wash., will be sold on street cars, effective Feb. 8, 1927, for 50 cents. This new fare does not replace either the token or the 10-cent cash fare offering similar riding privileges. The 5-cent inner zone fare will likewise remain.

Decision to institute the new fare was reached after conferences between city officials and members of the City Council. The new fare is simply another experiment designed to provide still further evidence of what is desired by the riding public, and how the necessary amount of revenue can best be obtained. Offer of the new fare came from Richard T. Sullivan, manager of the railway. It will give a fare of 8⅓ cents for riders who do not care to invest $1 in tokens, or who do not find it convenient to go to one of the regular token-selling places. The wide difference between cash fares at 10 cents and the token at 6⅔ cents has led many people who would otherwise not bother with tokens to purchase them, Mr. Sullivan states. The new ticket fare will practically restore the former 8-cent cash fare.

Report of the railway for December, with about ten days under the zone system included, showed an increase in gross earnings but a decrease in earnings per mile.

New York City's Transit Bills Introduced

Bills embodying the New York City administration transit program were introduced in the Senate and Assembly on Feb. 17 by Minority Leaders Bernard Downing and Maurice Bloch.

One bill amends Sections 32, 39, Chapter 4, laws of 1891 (New York City rapid transit act) by authorizing acquisition of any railway by eminent domain in the event that terms and conditions may not be agreed upon between the board or commission representing city and owners or operators of the railway.

A second measure amends Section 11, city home rule law, by empowering local legislative body of city to enact laws for ownership, establishing, construction, acquisition and operation of municipal bus and trackless trolley lines.

A third measure adds new Section 134-a to the Chapter 480, laws of 1910, public service commission law, giving the Board of Transportation such additional powers and duties as may be conferred by local legislative body of city under the city home rule law.

A fourth bill amends Section 134, public service commission law, by stripping the Transit Commission of all powers except that relating to the rapid transit readjustment plan and conferring such powers on the transportation board.

The fifth bill adds new subdivision 12, Section 49, public service commission law, by authorizing any municipality to cancel a contract, franchise or certificate for privilege of transporting passengers or property if lessee, operator or grantee thereunder shall petition, or accept the benefit of the exercise of, the powers by the commission in altering, changing or modifying the rate of fare fixed in contract.

Another Finding in Superior

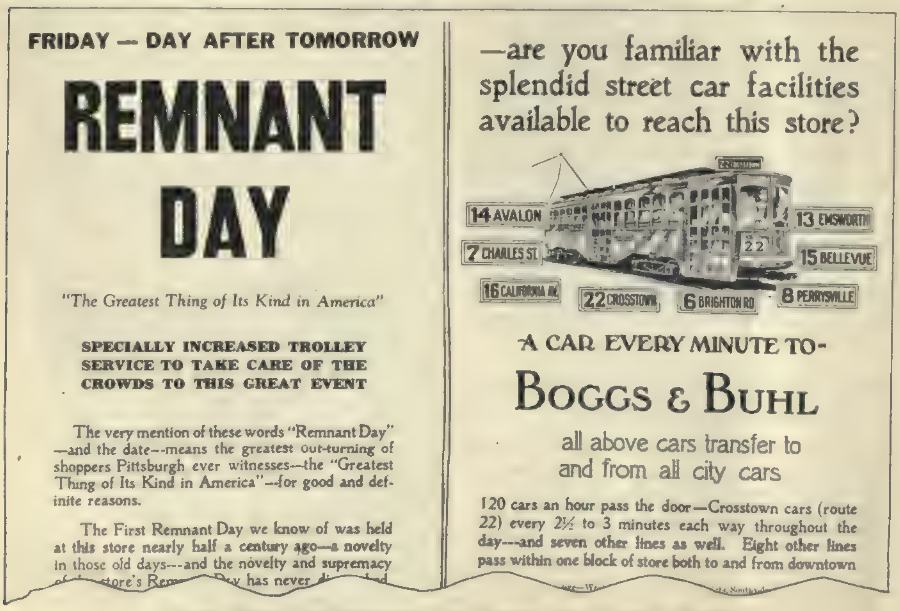
A coroner's jury exonerated the one-man street car operator, grade crossing switchman and train engineer of all blame for the street car-passenger train crash at Superior, Wis., on Jan. 6. The Duluth Street Railway was censured because of the use of one-man cars at this dangerous point, negligence was charged on the part of the Railroad Commission because it refused a previous petition for extension of a viaduct over the tracks where the accident occurred, neglect was intimated in the case of the Great Northern Railroad for allowing its trains to operate at an excessive rate of speed over the crossing, and negligence was charged on the part of the Northern Pacific Railroad because the gates at the crossing had not functioned properly at the time of the accident.

Department Store's Full-Page Ad Features Pittsburgh Service

One of the most remarkable examples of the co-operation between the Pittsburgh Railways, Pittsburgh, Pa., and other interests of the community is the full-page advertisement which Boggs & Buhl ran in the Pittsburgh newspapers on Jan. 19 to feature their annual "Remnant Day." The announcement was repeated the next day, but in smaller space.

The Boggs & Buhl department store is on the so-called Allegheny side of the city and therefore not in the general metropolitan shopping area of Greater Pittsburgh. On that account many Pittsburgh prospects must figure on using transfers.

To offset the disadvantages of location, Boggs & Buhl have worked in closest harmony with the commercial department of the Pittsburgh Railways to assure ample service for their patrons. Their annual "Remnant Day" is a really big feature in Pittsburgh's retail merchandising and the Pittsburgh Railways made every effort to see that ample service would be provided. In turn, Boggs & Buhl showed their appreciation by featuring the electric railway more than the sale itself. The motto seems to have been: "Get 'em on the cars first and the sale will take care of itself." The full-page advertisement was concluded with the slogan: "The Weekly Pass Is a Wise Investment."


14 AVALON
13 EMSWORTH
7 CHARLES ST.
22
15 BELLEVUE
16 CALIFORNIA AV.
22 CROSSTOWN
6 BRIGHTON RD
8 PERRYSVILLE

FRIDAY — DAY AFTER TOMORROW

REMNANT DAY

"The Greatest Thing of Its Kind in America"

SPECIALLY INCREASED TROLLEY SERVICE TO TAKE CARE OF THE CROWDS TO THIS GREAT EVENT

The very mention of these words "Remnant Day" —and the date—means the greatest out-turning of shoppers Pittsburgh ever witnesses—the "Greatest Thing of Its Kind in America"—for good and definite reasons.

The First Remnant Day we know of was held at this store nearly half a century ago—a novelty in those old days—and the novelty and supremacy store's Re Day has never

—are you familiar with the splendid street car facilities available to reach this store?

A CAR EVERY MINUTE TO—

BOGGS & BUHL

all above cars transfer to and from all city cars

120 cars an hour pass the door—Crosstown cars (route 22) every 2½ to 3 minutes each way throughout the day—and seven other lines as well. Eight other lines pass within one block of store both to and from downtown

Upper Half of Pittsburgh Ad—Lower Half Listed Routes

New Name for Inland Empire Under Great Northern Control

After announcing that the properties of the "Inland" and allied interests, recently purchased by the Great Northern Railroad, would be known hereafter as the Spokane, Cœur d'Alene & Palouse Railway, officials at Spokane canceled this new name and have made plans to have the name changed legally to the Spokane & Idaho Northern Railway. Approval of the transfer of the properties to the Great Northern is now pending before the Interstate Commerce Commission.

Commercial organizations in towns of the Idaho panhandle requested the Spokane & Idaho Northern title based on grounds that the name Spokane has always been used in the several titles which these roads have borne, and because the name of the state of Idaho has not been properly recognized and used by business interests. The second change in names was made largely in deference to the wish to foster a spirit of good will.

The properties to be purchased by the Great Northern consist of electric interurban lines out of Spokane, most recently known as the Spokane & Inland Empire Railroad, to Moscow, Idaho, and the Spokane & Inland Empire, operating to Cœur d'Alene, Idaho.

Suburb Agrees to Cleveland Railway Plan

According to the Cleveland *Plain Dealer* the second long step in carrying out the metropolitan traction program for the Cleveland Railway system has been taken by the Cleveland Heights Council. The program was submitted in June, 1925. The Cleveland Council approved it in April, 1926. Now the Heights acts more than eighteen months after the commission finished its work. East Cleveland and Lakewood have yet to act.

The new franchise shows the fruits of negotiation. The company wins the one concession which the metropolitan commission considered essential to the plan; that is, the suburb agrees to pay a fare 1 cent above what city passengers pay. In return for this the company agrees to build extensions on Mayfield and Cedar Roads and to establish a bus line on Fairmount Boulevard. These terms must have the approval of the Cleveland Council, but no difficulty on that point is anticipated. The community now awaits action by Lakewood and East Cleveland.

"No Accident" Reward Plan in Trenton

The Trenton & Mercer County Traction Corporation, Trenton, N. J., has put into effect a "No Accident Bonus Plan," whereby a bonus of $1 a week will be credited to each operator with a clear accident record during that week. Payments of bonus will be made in a lump sum covering four weeks. To be eligible to receive the weekly credit the operator must work at least five days of the week, a regular man must total at least 40 hours and an extra man at least 35 hours.

Notes from Knoxville on Fares and Threatened Bus Competition

C. H. Harvey, president of the Knoxville Power & Light Company, Knoxville, Tenn., says that the new fare arrangement put into effect on Jan. 3, consisting of the sale of weekly passes at $1.25 per week, five tokens for 30 cents and single cash fare of 10 cents, has met with very general public approval, and that the company has had many letters of commendation and oral comments on the convenience of the pass, the purchasers finding so many different ways that the pass can be used to advantage. He feels, however, that the question of whether or not this new system is going to be satisfactory to both the public and to the company can be determined only upon further trial.

In this connection it is of interest to note that the application made some time ago by the Knoxville Rapid Transit Corporation for a franchise has been revived and that early action by the Council has been requested. The position of the Knoxville Power & Light Company with respect to this matter is that the granting of this general franchise for bus operation is undesirable because there is no necessity for the general installation of bus routes in the city and because this kind of competition is ruinous and against the public interest. The Knoxville Power & Light Company has been willing, and is willing, to install and operate buses where and when this service is necessary and bears promise of resulting in a reasonable profit. The position of the company is that it would undoubtedly be in the interests of Knoxville to have any buses installed operated by the utility in conjunction with its street railway system, but it feels this should not be required of the company until the public convenience and necessity is sufficiently great as to justify it.

"Ride in the Street Cars" in Seattle

Plans to make the week of Feb. 21-28 in Seattle, Wash., a "Ride in the Street Cars" week, during which every one will be urged to use the street cars and help put the system on a paying basis, have been adopted by a newly organized "Ride in the Street Cars" Club, in which is represented service clubs, commercial clubs and improvement clubs. All other clubs in the city will be asked to get behind the movement and line up the people in their localities, so that the receipts of the week will help materially in getting the railway back on a cash basis. A speakers' bureau is being organized to cover club meetings for the next three weeks. Automobile owners will be asked to favor the cars for one week, refrain from picking up passengers and give the cars all possible patronage. Clifford Wiley, chairman of the club, states that the movement is in nowise directed against the automobile. He asserts that the fact that practically every club member owns a car does not relieve him of the responsibility of supporting the municipal railway as much as possible.

News Notes

Would Grant Right of Eminent Domain to Interurbans.—The North Carolina Senate has passed and sent to the House a bill to allow interurban railways to do business in the state and to give them the right of eminent domain.

New Franchise in Leavenworth.—Officials of the Kansas City, Leavenworth & Western Railway and the City Commission of Leavenworth, Kan., have agreed upon the terms of a new twenty-year franchise for the railway to operate over city streets.

Fare Increase Proposed in Williamsport.—Little more than a week after the Public Service Commission approved the merger of four railway companies in Williamsport, Pa., the consolidated concerns known as the Williamsport Railways filed a new tariff, increasing the present rates. Under the new schedule, announced by the commission, the present fare of 5 cents would be raised to 8 cents with two tokens for 15 cents. The increase becomes effective March 1.

Fourteen Men Have Perfect Record.—Throughout the year ended Dec. 31, 1926, fourteen employees of the Tide Water Power Company, Wilmington, N. C., held a perfect safety record. During this time they operated cars over the system without a single accident being charged against them. The total car mileage operated during the year was 738,000 miles.

Must Preserve Safety Rules.—Orders have been issued by the Board of Public Utility Commissioners of New Jersey for the Ocean City Electric Railroad, Ocean City, N. J., to improve service over its lines. After investigation the board stipulated that all one-man cars should have properly controlled doors and folding steps, rear doors for emergencies, automatic signals to notify operators when the rear doors are opened and a signal system to enable passengers to notify the operator to stop the car.

All One-Man Cars in Rockford.—The Rockford Public Service Company, Rockford, Ill., which recently acquired the Rockford traction interests, introduced one-man cars on all its lines on Feb. 15. Inclusion of the one-man car clause in the franchise to the new company was considered one of the outstanding features of that grant.

Fine Accident Record in Kansas City.—The 1926 accident record of the Kansas City Public Service Company, Kansas City, Mo., is one of the most impressive the trainmen of the company have ever made. During the year 681 trainmen operated day in and day out without having an accident of any kind for which they were responsible. Motorman J. D. Shepard of Ninth and Brighton headed the list.

Will Look Into One-Man Operation.—City officials of Portland, Ore., recently started an investigation to determine whether the one-man street cars on Broadway Avenue, operated by the Portland Railway & Light Company, at night interfere with traffic. If they do the company will be "invited" to discontinue that sort of operation. The question has also been raised as to the one-man operation of cars on other heavily traveled lines, and the whole question may be considered by the Council at an early hearing. City officials are resentful, it is stated, over the fact that the change in operation had been made without consulting the City Council or traffic department.

Safety Course in Session. — The Beaver County Section of the Western Pennsylvania Safety Council announced the third annual safety lecture course from Jan. 6 to Feb. 24, 1927. The sessions are held every Thursday evening from 8 to 9.30 in the auditorium of the Carnegie Library. This is a course for foremen, superintendents, employers, employees and others interested in the prevention of accidents in the home, the streets, the factory, the mine and mill. In connection with the course H. O. Allison of the Beaver Valley Traction Company invited the trainmen and coach drivers of his company to be present at the lecture on Feb. 3.

Tokens in Seattle Stores.—Tokens for use on the Seattle Municipal Railway, Seattle, Wash., will be sold at all downtown stores beginning Feb. 8. This is part of the plan to speed up cars and reduce operation costs, relieve traffic congestion by quicker loading, and provide a service to the rider. All downtown stores have agreed to co-operate with the railway officials and have offered to make special displays of the tokens, including window displays, to attract customers' attention. Cards have been printed and will be displayed on the cars urging patrons to buy their tokens before getting on the cars. One of the slogans is: "A token in the hand saves time."

Fire Insurance on Railway Property.—The Detroit Street Railway Commission at its meeting on Jan. 25 voted to take out $5,000,000 in blanket fire insurance on municipal railway property and to distribute the insurance equally among six agencies and companies. Sixty-eight bidders were reported, the successful ones selected by the commission being Johnson & Higgins, Willett & Hughes, Michigan Insurance Agency, John A. Parks Company, Edward T. Fitzgerald and Gorman & Thomas.

Commission's Order to Stand.—Under a stipulation filed, the Public Service Commission on Feb. 11 discontinued the proceedings instituted by the Mayor of Elmira, N. Y., against the Elmira Water, Light & Railroad Company over rates charged by it for gas and electricity and street railroad transportation, and permitted the withdrawal of the complaints and cross-complaints. The order provided that nothing therein contained shall affect or impair the order of the commission on May 7, 1925, authorizing a maximum street car fare of 7 cents in Elmira, and the tariff filed under this order is to remain in full force and effect. Commissioner Van Namee said that an increase in rates would be necessary if the company were to obtain anything like a fair return on the value of its property.

Recent Bus Developments

Bus Substitution Considered on New Jersey Interurban

Because of the bad condition of paving on a number of streets over which the Morris County Traction Company operates in Essex and Morris Counties in New Jersey proposals have been made that car service be discontinued and bus service started in its place. The main line of this railway is between Lake Hopatcong and Maplewood, where connection is made with tracks of the Public Service Railway, permitting through operation to the center of Newark. In all, nearly 50 miles of track is operated, about half of which is on private right-of-way.

For a number of years the company has been in financial difficulties. In July, 1923, a receivership was ordered by the court because of the refusal of a minority interest to agree to a refinancing plan. Prior to that, in 1918, the earnings being insufficient to meet the full interest charge on the bonds, the bondholders agreed for a period of five years to exchange the 5 per cent coupons on their bonds for new coupons at 2 per cent and income trust certificates to cover the difference. Under the trust agreement the 3 per cent coupons attached to the income trust certificate were automatically canceled each year when the earnings were insufficient to permit payment. During the following five years the 2 per cent coupons were regularly met and the income trust certificates were canceled.

Before the expiration of this proposal, in 1923, a refinancing plan was submitted to the bondholders. According to this plan they were to accept new bonds at 6 per cent for half of their holdings and non-cumulative preferred stock for the other half. Execution of this plan required the consent of all bondholders. Unfortunately, three individuals out of a total of 286, representing only 3.13 per cent of the bonds, refused to deposit their holdings for exchange and the refinancing plan could not be undertaken.

When the original paving agreements were made macadam paving was in general use throughout the territory in which the company operates, and it was stipulated that the paving work done by the railway should be of this type. In recent years, however, heavier pavements have come into use and an attempt has been made to have the railway install these more expensive kinds. To this the company has objected. As a solution of this difficult problem a bill was introduced in the New Jersey Legislature a year ago to relieve electric railways in part of their paving obligations. Although passed by the Senate and General Assembly, this bill was vetoed by the Governor and the question reverted to its original status. A similar bill has recently been presented to the Legislature, but no action has yet been taken.

Meanwhile O. G. Schultz, general manager of the railway, has proposed to remove the tracks and operate buses from Maplewood to Lake Hopatcong. Formal application for the necessary permits has not yet been made, but it is said that the company is hopeful of making the change by April 15. The municipalities would then do the repaving. Much favorable comment has been made concerning the pavement improvement feature of the plan.

Bus Service for Wisconsin Cities

Service on the lines of the Wisconsin Public Service Corporation in Two Rivers and on the interurban line between Two Rivers and Manitowoc will be abandoned if the Wisconsin Railroad Commission and the cities affected approve the discontinuance. Both the city service in Two Rivers and the interurban service are being run at a loss. In addition the city of Two Rivers has started an extensive paving program on streets occupied by the city lines and the interurban which would entail a burden heavier than the railway feels the traffic can bear.

C. R. Phenicie, vice-president of the company, who appeared before the City Councils of Two Rivers and Manitowoc recently, stated that ever since the corporation purchased the Manitowoc & Northern Traction Company the road has been operated at a loss. It is his idea to discontinue railway service and establish service by bus in Two Rivers and between the two cities. Several months ago railway service was abandoned in Manitowoc due to lack of patronage and the street cars there were replaced by a bus system.

Injunction Sustained at Louisville

A motion to dissolve a temporary injunction restraining the People's Transit Company, Louisville, Ky., from operating buses on Broadway was overruled by the Court of Appeals at Frankford on Feb. 12. The court, in overruling the motion, ordered the case heard on its merits.

The temporary injunction was granted the Louisville Railway by Judge William H. Field recently and carried to the Court of Appeals by the bus company.

The question to be decided, Judge Thomas said, was whether the operators were required to hold a franchise when they have already been granted licenses and permits by the city.

The court said that the question is "a far-reaching one since it would not only affect the various municipalities in the commonwealth, but it might also affect a county if it should attempt to grant such privileges over its public highways." In view of this it ordered the case tried on its merits.

The transit company in its appeal against the injunction said it was operating under a permit and license issued it by the city, while the railroad contended that "privileged" users of highways must have a franchise.

Auto Stages to Replace Interurban Trains in Washington

In the face of considerable opposition, the Department of Public Works at Olympia, Wash., recently granted the application of the Pacific Northwest Traction Company, which operates an interurban-stage line between Seattle and Bellingham, to substitute stages for certain interurban trains between Bellingham and Mount Vernon. The department was urged by the City Council, Chamber of Commerce and practically every civic club in Bellingham to grant the permit, declaring that Bellingham and Whatcom County are being discriminated against because they had no stage connections to Skagit County and Seattle and that the service would be a convenience and necessity.

The department granted the permit after the company testified that the gross operating revenues of the interurban had decreased steadily during the past few years; that it was necessary to increase the revenues between Mount Vernon and Bellingham and to curtail the operating expenses of the electric interurban line, which would require a reduction in the amount of service rendered; that increased patronage might be expected by reason of the coordinated service, and the fact that the bus is able to render more service to intermediate points along the highway than is now furnished by the electric railway.

The permit was opposed by a group of residents of Skagit County in Mount Vernon and Anacortes, who now threaten to carry their fight to the courts. Attorneys for the objectors declared that there was sufficient ground for appeal because of the basis upon which the department rested its decision, which they declared amounted to a subsidy for the railway by the department because the company had not been making sufficient money. The department declared that the objections of the Skagit County residents were not germane to the issues involved and were without the jurisdiction of the department. They include a charge of increased danger to the general public by reason of increased traffic, excessive speed and insufficiency of present tax methods to cover adequately the use of public highways by motor vehicles.

Tax on Interstate Buses Upheld

Much attention has been attracted by the decision of the United States District Court in Connecticut confirming the right of the state to levy a mileage tax on buses engaged in interstate commerce. It appears that a law was passed in Connecticut in 1925 imposing a tax of 1 cent a mile on interstate buses traveling on State highways. The Interstate Buses Corporation contested the act as unconstitutional under Section 8, Article I, which gives to the Congress the regulation of commerce among the several states. The law did not undertake to make interstate commerce subject to the jurisdiction of the utilities commission as the intrastate carrier is in Connecticut.

The opinion was written by Judge

Martin T. Manton of Brooklyn. Another Brooklyn Judge, Marcus B. Campbell, also sat in the court, and the third judge was Edwin S. Thomas of Norwalk, Conn. Judge Manton wrote that there could not now be a serious doubt that where the state had at its own expense furnished special facilities such as highways for the use of those engaged in commerce, interstate as well as domestic, it could exact compensation therefor. The theory of the excise tax, he said, was consistent with the rulings of the United States Supreme Court in cases concerning the use of special privileges and facilities. All that was required was that the tax should be reasonable in relation to the privilege. He wrote:

> As long as the discretion exercised by the State goes to the point of exerting its taxing powers in proportion to and adjusting the scheme, basis and amount of the tax to the possible extent and result of the use of the roads it is not an interference against interstate commerce. The state, however, may not enact a statute which requires an interstate carrier of passengers by motor bus to secure a certificate to establish the public convenience and necessity of operating the buses.
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> Interstate business must pay its way and the expenses to others incident to the use of it.

Steam Bus Tested in New York

The Fifth Avenue Coach Company, New York, is testing a standard bus chassis driven by a new type of automotive boiler. Used with a steam engine of conventional type, the vehicle is said to combine flexibility and economy. The tests are under the supervision of L. H. Palmer, vice-president of the Fifth Avenue Company, and William McClellan of the engineering firm of McClellan & Junkersfeld, Inc. Ten tons of railway car axles are used on the test chassis to approximate the weight of a fully loaded bus. The vehicle is being driven about the city, particularly in the hilly districts of Washington Heights. Both Mr. Palmer and Mr. McClellan said the tests were not far enough advanced to determine definitely how it would operate under actual working conditions. The device is also being studied by one large city electric railway as a substitute for the expensive underground conduit system.

Buses Supplant Cars. — Implying abandonment of its interurban line between Raymond and South Bend, Wash., the Willapa Electric Company has been granted permission to provide service by bus between the two cities.

Applies for Permission to Run Buses. —The St. Louis Bus Company, affiliated with the United Railways, St. Louis, Mo., has applied to the St. Louis Board of Public Service for permission to operate buses on Olive Street when that street is widened from 60 ft. to 100 ft. between Twelfth Boulevard and Channing Avenue. The bus line would cooperate with the cars of the railway.

Buses Replace Cars.—The Worcester Consolidated Street Railway has discontinued railway service on its line between Clinton and Worcester, Mass., and substituted bus service. The change became effective on Feb. 7. C. V. Wood, president, has announced that it is probable other suburban lines operating out of Worcester will be converted to bus operation.

Financial and Corporate

Boston "L" Reorganization

Chairman of the Metropolitan Board Outlines Plan Now Up for Extension of Public Control.

Henry I. Harriman, chairman of the Division of Metropolitan Planning, which has reported to the Legislature of Massachusetts the proposition for reconstruction of the financial structure of the Boston Elevated Railway with a 50-year extension of the term of public control, has submitted to the committee on metropolitan affairs and the committee on street railways of the Legislature a statement of reasons and recommendations.

NEW RAPID TRANSIT COMMISSION PROPOSED

He says that a reorganization of the Elevated would be accomplished through the sale of its assets to a new rapid transit corporation for approximately $24,000,000 of common stock upon which 5 per cent was guaranteed and $26,000,000 of preferred stock upon which 4½ per cent was guaranteed, the new transit company, of course, assuming the obligations of the Elevated. Public control would be extended to the new transit company for a period sufficiently long to permit the preferred stock to be retired through the operations of a sinking fund by the end of the new period of public control. He said in part:

> In my explanation of the bill I referred specifically to a dividend saving of approximately $800,000 and referred in a general way to additional savings which would be made in tax payments, both under the plan suggested and under a modification of the same which would substitute 4½ per cent debentures for the 4½ per cent preferred stock, it, of course, being understood that the debentures, like the preferred stock, would be tax free in Massachusetts and would be paid off during the period of public control. Since the hearing the details of the tax savings have been worked out and are most interesting and important.
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> The federal corporation tax is 13½ per cent on the net earnings (which in the case of the Elevated are its dividend payments), and a saving of $800,000 in dividend payments, therefore, means an additional saving in federal taxes of a little more than $100,000, bringing the actual saving under the plan suggested by us to $900,000.

DEBENTURES FOR PREFERRED STOCK

> If debentures are substituted for preferred stock, such substitution will change a dividend payment into an interest payment upon which there is no federal corporation tax. This interest payment will be a trifle under $1,200,000 a year, upon which the federal corporation tax saving will be about $160,000 annually. This saving should be added to the previous saving of $900,000, making the total saving about $1,060,000. The substitution of debentures for preferred stock will also effect a saving to the Elevated road of between $310,000 and $340,000 in its present Massachusetts franchise tax, so that the total immediate saving to the Elevated road resulting from the adoption of our plan of reorganization, modified, however, by substituting debentures for preferred stock, would be approximately $1,400,000, to which should be added a further saving of at least $200,000 in bond interest as old issues mature and new issues at lower rates are put out. This larger saving will make it feasible to set up a somewhat larger reserve for the retirement of the debentures and thus make possible a shorter term of public control, say to 30 years, if it is deemed desirable.

As either the preferred stock or the debentures will be callable for the retirement fund at par it is safe to assume that the retirement fund will be compound at 4½ per cent per annum. Accordingly, the $26,000,000 of debentures or preferred stock of the new company can be retired by an annual payment of $420,000 if the term be reduced to 30 years, or $235,000 per annum if it be reduced to 40 years.

An annual payment of $470,000 would retire both the preferred and common stocks at the end of a 40-year term. With any of the above payments the balance of the savings effected by the reorganization of the Elevated, and available for the payment of the indebtedness to the city and for new subway rentals, would be from $900,000 to $1,200,000. Because of the large savings effected Mr. Harriman recommends the substitution of the tax-free debentures for preferred stock in the reorganization plan.

This substitution of debentures for preferred stock might be objected to by the present bondholders on the theory that it unbalances the present ratio of stock to indebedness. As the debentures would be all guaranteed by the state and would all be retired within the period of public control, it would be perfectly safe to make these debentures junior to the outstanding bonds. It would also be necessary to make the debentures tax exempt in Massachusetts in order to make them a form of security acceptable to the present preferred stockholders.

Gary Employees Subscribe 100 Per Cent for Railway Stock

Employees of the Gary Railways, Gary, Ind., brought to a successful close on Feb. 14 the company's preferred stock sales campaign by subscribing 100 per cent to their allotment. Every one of the 310 employees of the railway subscribed for one or more shares, thus topping the mark established during a similar campaign in the fall of 1925, when 92.6 per cent of the employees purchased stock. The average holding is less than 1½ shares per employee.

The present issue of $200,000 par value of 7.2 per cent class A preferred stock was offered for sale under the customer-ownership plan beginning on Feb. 1 by the Utility Securities Company. Employees of the Gary Railways were the only persons participating in the public sale. Because of the limited number of shares available, orders from employees were given first consideration during the first five days of the sale. Subscriptions from patrons and other investors in communities served by the company were unusually heavy and the issue was oversubscribed within ten days.

The stock was offered at $98 a share, either on cash or deferred payment terms, at which price it yields about 7⅓ per cent in annual dividends.

Redemption Plan Suggested

Seattle Bondholders Co-operate with Mayor in Alleviating Railway's Burdens—Herberg Suit Continues

A plan for the reduction of bond redemption payments on the Seattle Municipal Railway, Seattle, Wash., from $833,000 a year to $500,000 a year by extending the bond redemption period over an additional eight years has been placed before Mayor Bertha K. Landes by A. W. Leonard, president of the Puget Sound Power & Light Company, as the reply of the railway bondholders to the request of the Mayor for co-operation in lightening the railway's financial burdens. Mr. Leonard recently returned from Boston, where he conferred with the board of trustees of the Stone & Webster interests.

As a condition the bondholders insist that the present contract provisions giving priority to the bonds over all other obligations of the railway be fully protected by necessary legislation. The present holders of the purchase bonds ask the city to use good faith in endeavoring to obtain an extension of other outstanding bonds, amounting to approximately $1,650,000, which would mature prior to the Stone & Webster bonds if the latter were extended. If this could not be readily arranged, the purchase bondholders will waive priority as to these bonds, with the understanding that no other bonds junior to them would be issued.

The bondholders, in their plan, also suggest that if they are willing to assist the utility $1,000 a day in deferring annual bond payments, it is only fair to the thousands of railway patrons that the city accelerate the steps it has taken to increase earnings and still further reduce operating expenses.

In this connection it has been estimated that a reduction in power costs would save the railway $200,000 a year. The sale of power to the railway constitutes approximately 9 per cent of the light department's business. Mayor Landes and several of the Councilmen favor the plan as a simple way out of the difficulties of the line.

While the Mayor and the City Council are considering the plan suggested by the Puget Sound Power & Light Company to reduce bond redemption payments on the Seattle Municipal Street Railway, litigation involving the railway in the federal and Superior courts is moving forward. Judge Calvin S. Hall of the Superior Court has ruled that the company will be a defendant in the suit started by J. G. Von Herberg to compel the city to apply all receipts of the railway first to wages of its trainmen before any provision for bond redemption or other obligation be made. Immediately after this ruling, Mr. Von Herberg filed a motion in federal court asking that a complaint the company filed there be dismissed so far as he was made defendant.

The city filed a similar motion in the federal court, asking permission to be withdrawn as a defendant in a suit the company filed on Jan. 13. The power company, in its suit, named both the city and J. G. Von Herberg as defendants, asking that the city officials be restrained from withholding payment of the bond redemption and interest on the railway purchase contract until operating expenses of the line have been paid. The city's motion asks that the company's bill of complaint be dismissed in so far as it refers to the city as a defendant.

Action by Mr. Von Herberg and the city indicates that both want to see the railway litigation settled in the state courts rather than in the United States courts. In his suit in the state courts Mr. Von Herberg sought to have the city enjoined from putting money into the railway purchase bond fund until operating expenses had been paid. The city filed a bill of interpleader asking that the power company be made a defendant.

Good Showing in Milwaukee

Net Income in 1926 Increased by $1,186,867—Financial Structure Improved During Year.

Operating revenues of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., from transportation of passengers, freight and express were $10,937,411 for the year ended Dec. 31, 1926, an increase of 3.03 per cent compared with the year 1925. Operating revenues of the electric and heating departments were $15,282,343, an increase of 14.24 per cent over the previous year. Net income available for dividends was $4,025,699, compared with $2,838,831 in 1925. Net capital expenditures for additions to property and for betterments during the year were $7,409,146, after deducting replacements and property that was withdrawn from service. These facts were disclosed in the annual report to the stockholders.

Expenditures in the railway utility include principally the construction of the new rapid transit line, consisting of new double track on private right-of-way; extension of double track on Center Street in the city of Milwaukee to 60th Street; double tracking Downer Avenue; extension of track on First Avenue; extension of double track on Forest Home Avenue; rebuilding and double tracking Twenty-seventh Street, and double tracking Howell Avenue. Approximately 10½ miles of new track was constructed and added to the system during the year.

Forty new one-man safety passenger cars were purchased and placed in service during the month of December. Twenty new buses were purchased during the year. Four new snow sweepers and other necessary transportation utility equipment were purchased or constructed in the company's shops.

The financial structure of the company was considerably altered and improved during the year. The ratio of funded debt to the total capitalization was 64.6 per cent on Dec. 31, 1925, and was reduced to 54.6 per cent on Dec. 31, 1926. This decrease was accomplished by the sale of additional common and preferred stocks to provide funds for retiring $6,500,000 consolidated first mortgage bonds which matured and were paid on Feb. 1, 1926. The proceeds of the sale of common and preferred stock were also used in part to finance new construction during the year. The total par amount of securities retired was $19,576,500 and the total par amount of securities issued was $22,435,900.

S. B. Way, president, states that the transportation revenues of the company showed some improvement over previous years; the operation of an increased number of one-man safety cars during the non-rush hours and improvements to passenger equipment and rapid transit service should improve the future earnings of the transportation department.

The relations between the employees and the company continue to be satisfactory. The Employees' Mutual Benefit Association has now 6,110 members. The Employees' Mutual Savings Building & Loan Association continues to be a very important factor in establishing homes for employees and their families. Upward of $10,801,960 has been provided members for this purpose since the inception of the association in April, 1914.

STATISTICS OF RAILWAY OPERATION AT MILWAUKEE

	1926	1925
Miles of track owned	429.74	419.28
Miles of track leased	1.90	1.90
Miles of revenue track operated	399.00	391.49
Revenue passengers carried	154,908,620	150,591,216
Transfer passengers carried	54,648,880	53,635,554
Per cent transfer to revenue passenger	35.28	35.61
Receipts per revenue passenger	$0.0677	$0.0677
Number of passenger and express cars owned	912	[illegible]
Number of passenger motor buses owned	141	124
Kilowatt system demand	182,868	174,604

INCOME ACCOUNT OF THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

		1926		1925
Operating revenues		$26,219,754		$23,992,653
Operating expenses:				
Ordinary operating expenses	$15,369,656		$14,415,619	
Depreciation	2,043,191		1,847,077	
Taxes	2,283,191		2,160,755	
Total operating expenses		$19,696,038		$18,423,451
Net operating revenues		$6,523,716		$5,569,202
Non-operating revenues		335,348		357,675
Gross income		$6,859,064		$5,926,877
Interest charges:				
Interest on funded debt	$2,266,754		$2,574,457	
Interest on depreciation reserve balance	521,979		471,814	
Interest on other reserves	44,630		41,772	
Total interest charges		$2,833,363		$3,088,043
Net income		$4,025,698		$2,838,831

Balance in Columbus $1,383,483

According to the report of the secretary and auditor of the Columbus Railway, Power & Light Company, Columbus, Ohio, the net balance of the company in 1926 was $1,383,483, against $672,600 for 1925. These facts were contained in the thirteenth annual report of the board of directors to the stockholders. Cyrus S. Eaton, president, states that the continued healthy growth of the company's business is reflected in the reports submitted.

During the year the company issued $1,857,100 of its first preferred 6 per cent stock. Of this amount $1,500,000 went to the public through its bankers and $357,100 to employees and customers. All stock was sold to the public, employees and customers at par in a customer-ownership campaign conducted by the employees of the company and supplemented by schedules of educational advertising in the Columbus daily newspapers.

INCOME ACCOUNT OF THE COLUMBUS RAILWAY, POWER & LIGHT COMPANY

	1926	1925
Railway operating revenues	$3,409,499	$3,383,966
Power, light & heat operating revenues	5,887,572	5,316,787
Non-operating revenues	33,187	10,236
Total gross revenues	$9,330,259	$8,710,989
Operating expenses	$5,086,958	$4,914,303
Taxes	953,239	912,275
Gross income	$3,290,061	$2,884,410
Deductions from gross income:		
Interest charges	$882,702	$848,577
Other deductions	64,126	66,974
Total deductions	$946,828	$915,552
Net income available for sinking fund, dividends and other financial requirements	$2,343,232	$1,968,858
Deductions from net income:		
Sinking found	$304,587	$319,439
Dividends:		
First preferred stock	329,207	164,794
Series B preferred stock	325,954	361,616
Common stock	....	450,408
Balance (credit to profit and loss account)	$1,383,483	$672,600

The company's policy of carrying out an extensive improvement program was continued. This is evidenced by the fact that total expenses chargeable to property account were $3,670,608. Of this amount $541,550 was used for track and roadway projects and $93,331 for cars and equipment. Railway improvements included new track, reconstructed track, track removal and special work. Rolling stock improvements included the overhauling of 166 cars and the painting of 115 cars. In addition six gas-electric buses were purchased during the latter part of the year and put in crosstown service. During the year 1.84 per cent of the gross receipts was used for claims cost.

PROFIT AND LOSS ACCOUNT OF THE COLUMBUS RAILWAY, POWER & LIGHT COMPANY

	1926	1925
Balance at beginning of year	$3,603,925	$3,053,726
Credits		
Balance from each year's operations	1,383,483	672,600
Delayed income credits	11,668	15,893
Miscellaneous credits	6,913	....
Total credits	$5,005,990	$3,742,220
Debits		
Dividends (paid in stock):		
Series A preferred stock	....	....
Series B preferred stock	....	....
Delayed income debits	$63,227	....
Miscellaneous debits	28,732	$138,294
Total debits	$91,960	$138,294
Balance at end of year	$4,914,030	$3,603,925

TRAFFIC STATISTICS OF THE COLUMBUS RAILWAY, POWER & LIGHT COMPANY

	1926	1925
Revenue passengers	64,841,596	64,591,271
Transfer passengers	16,573,110	16,420,874
Total passengers	81,414,706	81,012,145
Per cent of transfers to total passengers	20.36	20.27
Revenue per revenue passengers in cents	5.09	5.09
Revenue per passenger including transfers, in cents	4.05	4.06
Car mileage	9,521,782	9,464,862

Springfield Property Passes to New Haven

Control of the Springfield Street Railway, Springfield, Mass., passed to the New York, New Haven & Hartford Railroad at a stockholders' meeting on Feb. 14. Directors were increased from seven to nine. They include E. J. Pearson, E. G. Buckland and A. P. Russell, New Haven; W. E. McGregor, Boston; George Dwight Pratt, Charles W. Bosworth, Clark V. Wood, George B. Bulkley and Henry A. Field, Springfield. The last three were re-elected. President Pearson of the New Haven was made chairman of the board, which immediately ratified the $1,500,000 improvement program. The executive staff of the Springfield Street Railway is unchanged. Clark V. Wood remains as active head. At a reorganization of the Springfield Railways E. J. Pearson was made president. New trustees with him are Messrs Buckland and Russell. C. M. Rogerson and Leverett Candee were re-elected vice-president and treasurer respectively of the Springfield Railways. William Crowe continues as secretary of both the Springfield Street Railway and the Springfield Railways and Bentley W. Warren as general counsel.

Approval Sought for Sale of Coral Gables Road

Approval of the sale of the Coral Gables Rapid Transit Company, Coral Gables, Fla., and all equipment is to be requested before the State Railroad Commission. Petition for the approval is to be filed within the next few days by John M. Murrell, Miami, attorney for the company. The monetary consideration involved was not given. It will be recalled that some time ago a proposal was advanced for the sale of the road to the city, but the information at present at hand about this latest move by the company does not make it plain whether or not the application now made is in furtherance of that plan.

Will Discontinue Line.—The Coast Cities Railway, Asbury Park, N. J., will discontinue its inside belt railway on March 1. The company claims that there is no further public demand for the belt line. The poles and tracks will be removed.

Capital Traction Would Buy Leased Line.—The Capital Traction Company, Washington, D. C., has opened negotiations for the purchase of the Washington & Maryland Railway, which runs from Fourteenth and Kennedy Streets, Washington, to Takoma Park, Md., according to reports received by the Public Utilities Commission. The company has been operating the line for the last ten years under a lease which expires on Feb. 19.

Increase in Capitalization Approved.—At the recent annual meeting of the Wisconsin Public Service Corporation, Green Bay, Wis., approval was voted of the plan recently projected to increase the authorized capital stock of the corporation from $8,500,000 to $20,000,000. Consequently the number of preferred shares will be increased from 55,000 to 125,000 valued at $12,500,000, and common from 30,000 shares to 750,000 shares valued at $7,500,000. The value of common stock at par is reduced from $100 to $10. It is not likely that any considerable amount of the stock will be issued in the near future.

$2,500,000 North Shore Notes Issued.—Halsey, Stuart & Company and the National City Company, New York, are offering for subscription at 99½ and interest, yielding more than 5.65 per cent, $2,500,000 of Chicago, North Shore & Milwaukee three-years 5½ per cent gold notes. The notes are dated Feb. 1, 1927, and interest is payable on Feb. 1 and Aug. 1. They are in the denomination of $1,000, $500 and $100.

Financing of New Rockford Companies Approved.—The Illinois Commerce Commission has authorized the Rockford Public Service Company, Rockford, Ill., to issue bonds to the extent of $1,000,000 against the company's holdings and stock to the amount of $500,000. The Rockford-Belvidere Railroad, recently acquired by the Ellis interests, has been authorized to operate the electric railway between Rockford and Belvidere and to issue $150,000 of stock. The formal approval of these plans completes all details of the financing of the successor companies at Rockford.

New British Columbia Director.—W. G. Murrin has been elected a director of the British Columbia Electric Railway, Vancouver, B. C., Canada. Mr. Murrin is vice-president of the railway.

Valuation of Discontinued Properties Computed.—Electric railway systems of the aggregate value of $591,225, located in Salem and Eugene, Ore., have discontinued operations owing to the failure of the public to support them adequately. The Public Service Commission has also authorized the Willamette Valley Southern Railway to discontinue the operation of 12 miles of railway in the Salem district. The books of the State Tax Commissioner show that the apportioned valuation placed on all these discontinued rail systems is $377,021. This source of state revenue will, necessarily, cease with the dismantling of the carrier lines in question. The Willamette Valley Southern is owned and operated by the Portland Electric Power Company, while the Salem and Eugene systems have been operated by the Southern Pacific Company.

Personal Items

G. R. Green Heads Master Mechanics

Superintendent of South Bend Road Heads Central Equipment Men's Organization

George R. Green, general superintendent of the Chicago, South Bend & Northern Indiana Railway, Michigan City, Ind., and its affiliated lines, the Southern Michigan Railway and the Railway Transit Company, a bus operating organization, has been elected president of the Central Electric Railway Master Mechanics' Association. Few men in mechanical circles in the Central Electric Railway Association's territory are better known than is Mr. Green; few men have had a career more spectacular than he and few have risen through the ranks to greater responsibility.

G. R. Green

Twenty-six years ago Mr. Green started to work at the age of fourteen as an armature winder's helper with the Detroit United Railway. He was not content merely to assist in winding armatures and then to wind them himself. He studied the whys and the wherefores. It did not militate one iota against his upward progress that he remained with the Detroit United property for eighteen years, except for three years between 1909 and 1912, during which time he was master mechanic of the Saginaw & Flint Railway.

At first promotions came slowly and advancement was by small steps, but initiative, persistence and hard work, combined with an interest in the problems of his company outside of his immediate duties, won for him deserved recognition. He finally rose to the position of general foreman of interurban equipment with the Detroit United Railway, but when he did attain that position, few other men in the country were better qualified by experience and training than was he.

In July, 1920, Mr. Green went to South Bend as superintendent of equipment. So thoroughly impressed was the management with the man's ability that when it appeared that railway service might be supplemented with buses, he was selected to study bus operation in other cities. When the new service was decided upon, he was placed in charge of starting the buses and operating them. Next followed his appointment to be general superintendent of the rail lines and buses. He was appointed to this post in March, 1925.

Retirements and Changes in Rockford

A. P. Lewis of Wichita, Kan., has been appointed general superintendent of the Rockford Public Service Company, recently acquired by T. M. Ellis. Mr. Lewis succeeds Archie Andrew, who retires from the post as superintendent of transportation of the old Rockford City Traction Company after 25 years service. Five veteran department heads in executive positions are retired under the new ownership. Besides Mr. Andrew they are Edwin Main, maintenance of way engineer; Shell R. Smith, claim agent; H. D. Hollenbeck, purchasing agent, and Otis R. Hill, superintendent of equipment.

J. D. Whittemore Resigns from Wheeling Company

Joseph Damon Whittemore has resigned as vice-president and general manager of the Monongahela West Penn Public Service Company, Wheeling, W. Va. He became connected with the Wheeling property in July, 1924. Three years prior to that he was associated with W. S. Barstow & Company, New York, as supervising executive of several utility properties in the East. During his residence in Wheeling he had charge of the operations of properties in Wheeling and Morgantown.

Mr. Whittemore is a New Englander by birth. In the time that he was at Wheeling the Monongahela West Penn Public Service Company expanded widely and practically all of the independent properties in northern West Virginia were purchased and amalgamated with the Monongahela West Penn Public Service Company.

Howard R. Whitney has been named operating vice-president of the Worcester Consolidated Street Railway, Worcester, Mass., as the personal representative of President Clark V. Wood to supervise and carry through the program of rehabilitation sponsored by the New York, New Haven & Hartford Railroad. Mr. Whitney is also vice-president of the Springfield Street Railway, but his office there will not be filled for the present. Mr. Whitney is being assisted in his work in Worcester by Henry C. Page, general manager of the Consolidated.

E. F. Kelley Assigned Additional Duties at Louisville

Edward F. Kelley, secretary to President James P. Barnes, Louisville Railway, Louisville, Ky., was recently appointed purchasing agent in addition to his secretarial duties. He succeeds in that capacity C. Edward Earley, to whom less arduous duties have been assigned.

Mr. Kelley is well known in the railway field, not only because of his work assisting Mr. Barnes but also as editor of the *News Service Bulletin*, a bimonthly publication of the Committee on Public Utility Information of the Kentucky Association of Public Utilities. It was his keen knowledge of electric railway affairs of the state and country and his realization of the difficulties confronting the utility companies and their relation to the public which brought him the editorship of the bulletin. In that work he has been constantly improving the understanding between the public and the company. He is also editor of *Trolley Topics*, the house organ distributed by the Louisville Railway among its employees.

E. F. Kelley

Mr. Kelley became associated with Mr. Barnes in 1905. Prior to that he was with the New York Central and thereafter with Mr. Barnes at Syracuse, Utica, Rome, Little Falls, Oneida, Rochester and Schenectady, N. Y. In 1920 he became secretary to Mr. Barnes at Louisville.

In his new work he will have complete charge of the purchase of supplies and materials for all departments of the Louisville Railway, the Louisville & Interurban Railroad and the Kentucky Carriers, Inc., as well as being superintendent of the office building in charge of maintenance of that building.

Besides the offices already mentioned Mr. Kelley is secretary of the Kentucky Association of Public Utilities and secretary and director of the Kentucky Committee on Public Utility Information. He is also secretary of the Louisville Kiwanis Club, which position he has held for the past seven years, and for a while was district secretary of the Kentucky-Tennessee District Kiwanis Clubs.

W. W. Foster Heads New York Interurban

Former Secretary, Treasurer and Manager of Rochester-Buffalo Road Is Made President—Other Changes

William W. Foster, for many years secretary, treasurer and general manager of the Rochester, Lockport & Buffalo Railroad Corporation, Rochester, N. Y., was elected president of the company to succeed E. R. Wood, Toronto, who retired, at a meeting of directors and stockholders in Rochester on Feb. 8.

Joseph D. Nailor was advanced from superintendent of transportation and equipment to general manager and treasurer. Mr. Nailor began his railway career eighteen years ago as a motorman.

Jerry D. Foster becomes secretary of the corporation, but retains his present position as auditor.

Allen S. Muirheid, Toronto, was re-elected vice-president. Herman L. Lang, trainmaster, was promoted to superintendent of transportation and Donald Dewitt was advanced from special agent to general traffic agent. L. D. Harner, general shop foreman, becomes master mechanic.

W. W. Foster

It was stated at the headquarters of the company in Rochester that Mr. Wood retired to devote his attention to other interests nearer his home in Canada, and that there would be no change in policy or operation as a result of the changes in personnel.

Mr. Foster, the new president, is very well known in New York State, not only for his association with electric railway activities but also for his banking and business affiliations. At the age of sixteen he entered the employ of the First National Bank of Syracuse as a clerk. Two years later he entered the service of Holden & Sons, wholesale coal dealers, as an accountant and cashier. In 1905 he became identified with electric railway interests when he went with the Beebe Syndicate as general auditor and assistant treasurer. This syndicate operated five interurban electric railways, including the Buffalo, Lockport & Rochester Railway, which was taken over in 1911.

In the railway field Mr. Foster seemed to have found his chief interest. In June, 1915, the Buffalo, Lockport & Rochester Railway was segregated from the Beebe Syndicate and at that time he became auditor, secretary and treasurer, moving his offices to Rochester, N. Y. A little more than two years later he was appointed general manager of the company, but still retained the position of secretary-treasurer. In April, 1919, the company was reorganized and the name changed to the Rochester, Lockport & Buffalo Railroad Corporation. Then it was that he was elected a director and appointed to the positions of secretary-treasurer and general manager. In June, 1926, he was elected president of the New York Electric Railway Association. He was born in Syracuse on Jan. 1, 1873.

The road he heads operates 67.9 miles of interurban railway across western New York connecting the important cities of Buffalo and Rochester, through transfer at Lockport, its western terminus. The line in general follows the route of the Barge Canal, serving the communities in the prosperous Lake Ontario fruit belt.

President Ready in New Office

The directors of the Key System Transit Company, Oakland, Cal., at their monthly meeting, held on Dec. 16, formally elected Lester S. Ready to the presidency. He assumed his new duties on Jan. 3, taking complete charge of the entire system. The new president has been chief engineer of the California Railroad Commission. His career has been reviewed before in the ELECTRIC RAILWAY JOURNAL.

Mr. Ready has accepted the presidency of the Key System Transit Company believing that with his thirteen years experience in the observation of public utility operation and in the active work of the regulation of these utilities he can be of material assistance both to the company and the people of the East Bay.

As he sees it, the development of a great metropolitan area such as the East Bay district is dependent upon utility transportation. A large part of the public must rely upon the facilities of the Key System for its means of travel. At the present time the Key System Transit Company is responsible for the safe, convenient and rapid transportation of at least 50 per cent of the traveling public of the East Bay district. Experience of other cities indicates that as the population grows a greater and greater percentage of the public must depend upon street car and bus transportation. Mr. Ready realizes that it is important that the problems of traffic and public transportation be solved correctly.

He has said that the aim and duty of the Key System Transit Company are to render to the rapidly growing East Bay district a good utility transportation service. As an evidence of the company's disposition to do this Mr. Ready recalled that during the last two years and ten months approximately $6,500,000 has been spent to enlarge and improve the facilities of the company that a better service may be rendered. Further improvements will be made as rapidly as it is financially possible.

Convinced that the best service can only be rendered to the community through the whole-hearted co-operation between the company and the public, Mr. Ready has stated for the company that it is ready and willing to co-operate with the public as far as it can and that he will appreciate suggestions from the public. Thus he enters upon his new duties convinced that, in view of the importance of adequate transportation to the development of a community, the problem can be worked out so as to be profitable both to the company and to the public it serves.

C. G. Adsit a West Towns Official

Charles G. Adsit, nationally known as an engineer, has been elected a director of the Chicago & West Towns Railway, Oak Park, Ill. He has long been interested in the affairs of the Georgia Railway & Power Company and is vice-president and executive engineer of that company. Previous to his affiliation with the company at Atlanta he had extensive engineering experience in the western part of the United States, in South America and in Mexico. His association with the Georgia company actually dates back to 1911, when he became resident engineer on the Tallulah Falls hydro-electric development. Later he was made consulting engineer and chief engineer, and had charge of the development of Mathis dam and reservoir and Burton dam and reservoir and the Tugalo development. On April 1, 1922, he was made executive engineer with authority and jurisdiction over engineering work of all departments. In May of the same year he was made a vice-president of the company.

C. G. Adsit

Ezra Brainerd, Jr., Nominated for I.C.C.

Ezra Brainerd, Jr., Muskogee, Okla., was nominated to be a member of the Interstate Commerce Commission on Feb. 16 by President Coolidge, succeeding Frederick I. Cox of New Jersey, whose reappointment was rejected. This action eliminates Pennsylvania from the contest for the post for which Cyrus E. Woods, backed by Senator Reed of Pennsylvania, was first nominated by President Coolidge. Mr. Brainerd is a lawyer and vice-president of the oldest bank in Oklahoma. He was graduated from Colgate University and the University of Michigan Law School. He is a Republican and was recommended by Senator Harreld.

New Commercial Department Functioning at Youngstown

With the appointment of D. J. Graham as assistant manager of railways of the Pennsylvania-Ohio Electric Company, Youngstown, Ohio, at the opening of the year the ride-selling activities of the Penn-Ohio System have been concentrated in a well-organized commercial department.

In this department will be centered all matters that have to do with checking and developing the service of the various transportation lines and making them have a stronger and stronger appeal to the traveler and to the people of the communities served. Here also will center the development of freight traffic, a branch that has been of steadily increasing value.

Associated with Mr. Graham as his aids in carrying on this work will be:

Charles J. Collins, general freight agent, in charge of the freight service of the system.

Donald S. James, general passenger agent, directly engaged in the duty of developing passenger business.

H. H. Best, supervisor of schedules, in charge of analysis and preparation of schedules of service.

Perry Weller, statistician, who will develop and keep records and checks of service.

The purpose of the commercial department will be to sell more rides through the application of good salesmanship in every department of the service—to build up and develop both freight and passenger business.

Victor Emanuel to Return to Utility Field

Victor Emanuel, former chairman of the National Electric Power Company, is planning to return to the utility field. He resigned as chairman last year, but continued as a director after the company was acquired by Samuel Insull. The National Electric Power Company was founded by Albert Emanuel, father of Victor Emanuel. It was learned recently that Mr. Emanuel had formed in New York State last October the United States Electric Power Corporation, which through a subsidiary, has acquired small utility properties in the State of Washington. The United States Electric Power Corporation has applied for permission to increase its capital from 100,000 shares of no par or nominal value to 800,000 shares.

C. E. Earley, who has been purchasing agent of the Louisville Railway, Louisville, Ky., for the last eight years, has at his own request been transferred to duties less arduous. Mr. Earley has been connected with the company for 35 years. He entered the service when he was only 15 years of age as a trolley boy and worked his way up to the position of purchasing agent.

Obituary

O. C. Macy

O. C. Macy, vice-president of the Chicago, Harvard & Geneva Lake Railway, Walworth, Wis., died recently. Early in his career Mr. Macy had been superintendent of the electric railway lines in Cairo, Ill. In 1908 he became affiliated with the East St. Louis & Suburban Railway in charge of the Alton division. In this work he continued until 1915, when he took charge of the East St. Louis, Columbia & Waterloo Railway. After severing his connection with the latter property he was employed in the automobile sales business for a while and then went to Chicago, where he served as vice-president of the Chicago, Harvard & Geneva Lake Railway. This property connects Harvard and Big Foot, Ill., and Walworth and Fontana, Wis. Late last year Mr. Macy came East on a business trip and became suddenly ill. He was taken to the Mountainside Hospital at Montclair, N. J., where he died of pneumonia.

Albert Bath

Albert Bath, one of the executives of the Detroit Department of Street Railways, died on Jan. 30. At the time of his death and for about two years previous he was division superintendent of the Trumbull-Northwestern belt line of the Municipal system.

Late in 1907 he became night foreman at the Trumbull Avenue carhouse of the Detroit United Railway. He was transferred soon after to the Jefferson carhouse and in May, 1909, was made day foreman of the Fourteenth Street carhouse. His promotion to assistant division superintendent of the Fourteenth and Crosstown lines followed in October, 1909. He was made division superintendent of the Harper-Sherman-Baker lines of the Detroit United Railway in July, 1915, and was transferred to the Trumbull Northwestern belt lines in January, 1925. Mr. Bath was born in Rochester, N. Y., in 1880.

Russell Robb

Russell Robb, senior vice-president and treasurer of Stone & Webster, Inc., died at Phillips House, Boston, on Feb. 15. Mr. Robb was one of the pioneer associates and earlier members of the firm of Stone & Webster and was known throughout the public utility industry as a sagacious leader of its inner councils. Modest and kindly in disposition, he was much beloved by those who came in contact with him.

The development of Stone & Webster's organization from its small beginnings nearly 40 years ago to its present magnitude and influence is, of course, due to no single individual, but as the first partner in this enterprise to enter the firm after Messrs. Stone and Webster, Mr. Robb's share in its upbuilding and his sound influence upon the utility industry cannot be reduced to measurement.

He was born at Dubuque, Iowa, Dec. 6, 1864; was graduated from the Massachusetts Institute of Technology in 1888, being a classmate of Charles A. Stone and Edwin S. Webster, and after two years of engineering service with the Thomson Electric Welding Company at Lynn, Mass., joined the engineering organization of Stone & Webster at Boston in 1891. In 1905 he was made a member of the firm and in 1920 was made senior vice-president and treasurer of the company which succeeded the former organization.

Mr. Robb was an officer and director in a long list of public utilities in the traction, light and power field. In 1896 he was the author of a book on "Electric Wiring," and in 1909-11 he lectured at Harvard University on public utility topics, his "Lectures on Organization" being privately printed in 1909. He was prominent in civic life in his home town of Concord, Mass., and was a member of the American Institute of Electrical Engineers and many other organizations and clubs.

John W. Smith, director of the Indianapolis Street Railway, Indianapolis, Ind., and also of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., died recently. He was 67 years old.

Jeston N. Chamberlin, secretary of the Beckwith-Chandler Company, Newark, N. J., died on Feb. 6 at Jefferson Hospital, Philadelphia, Pa., following an operation. Mr. Chamberlin had been connected with the Beckwith-Chandler Company fourteen years as secretary in charge of railroad sales. He was 46 years old.

Louis Lewis, formerly of Richmond, who assisted in building the first electric railway in Richmond, died recently in Philadelphia. At the time of his death he was president of the Central Automatic Sprinkler Company, Philadelphia. Following his work in the railway field, Mr. Lewis designed and built the electric power equipment in many large mills and institutions in the country. He was 78 years old.

Robert W. Seebaum, assistant claim agent for the Cincinnati Street Railway, Cincinnati, Ohio, died at his home in that city on Jan. 11 following a long illness. Mr. Seebaum, had been connected with the claim department of the railway for 23 years. He was graduated from Columbia University and attended the Cincinnati Law School.

Lynn Shaddeau, purchasing agent of the Saginaw Transit Company, Saginaw, Mich., died suddenly on Jan. 18. Mr. Shaddeau had been connected with the Saginaw Transit Company and the Saginaw-Bay City Railway, its predecessor, for twenty years. His death marks the first break in the new organization since its inception three years ago. Mr. Shaddeau was born in Saginaw in 1886.

John S. Moore, general passenger and freight agent of the Chicago, South Bend & Northern Indiana Railway and the Southern Michigan Railway, both of South Bend, Ind., died recently. Mr. Moore had been connected with these companies since 1918. Previous to that time he had been in the freight department of the South Shore Railway and had been employed by the Wabash Railroad in the capacity of station agent at different points on its line.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

$724,372 Net Profit for Brill

Car Builder Reports Approximately $7,250,000 of Work on Hand Jan. 1, 1927

For the year 1926 the combined output of the J. G. Brill Company's four plants amounted in sales value to $10,416,381.

The combined output for each of the past seven years follows:

1920	$17,537,293
1921	7,647,898
1922	10,177,582
1923	18,167,486
1924	8,721,726
1925	9,101,909
1926	10,416,381

After deducting from earnings all cost of operations, in which are included maintenance and repairs and depreciation for the year amounting to $507,602 and after setting aside out of earnings reserve for federal income taxes, not yet due, of $109,178 the result of the operations of all the plants of the company shows a net profit for the year of $724,372.

The amount of work on hand on Jan. 1, 1927, was approximately $7,250,000, compared with $3,850,000 at the same time last year.

CONSOLIDATED PROFIT AND LOSS AND EARNED SURPLUS ACCOUNTS OF THE J. G. BRILL COMPANY AND SUBSIDIARIES FOR YEAR 1926.

Total net sales billed		$10,416,381
Cost of sales, including operating, selling, administration and general expenses and depreciation for the year, less miscellaneous income		9,582,831
Operating profit		$833,550
Less estimated federal income and state taxes for 1926		109,178
Net profit to earned surplus		$724,372
Earned surplus at Dec. 31, 1925		$4,916,668
Surplus adjustments		....
		$4,916,668
Add profit as above		724,372
		$5,641,000
Less dividends paid—		
Preferred	$320,600	
Common	200,425	521,025
Earned surplus at Dec. 31, 1926		$5,120,015

Milwaukee Company Has $5,000,000 Railway Budget

Nearly $5,000,000 will be spent for railway and bus improvements by the Milwaukee Electric Railway & Light Company and five other North American subsidiary companies, according to a recent statement issued by S. B. Way, president of the Milwaukee utility. The entire addition and betterment program will cost approximately $11,449,000. Of this amount $4,492,184 for improvements and additions to the electric railway and bus transportation service in the Milwaukee area. In the territory served by the Wisconsin Gas & Electric Company, operating in Racine, Kenosha, Waukesha, Watertown, Burlington and a score of smaller communities in southeastern Wisconsin, $105,334 will be expended for railway and bus improvements. While in the Appleton district, the Wisconsin Traction, Light, Heat & Power Company is slated to spend $152,314 in improving its railway and bus service.

Montreal Tramways Has $1,000,000 Rolling Stock Program

Fifty new street cars and ten new auto buses to cost approximately $1,000,000 shortly will be added to the equipment of the Montreal Tramways. Although plans for the cars have not been completed, it is understood the order will include 25 double-truck cars of a different design from those now in use on the St. Denis route. Each car will cost $17,000 and delivery is expected in the early fall. Approximately $130,000 is being spent by the company for new auto buses, each bus to cost approximately $15,000. They are being manufactured by the Yellow Truck & Coach Manufacturing Company. Delivery on this order of ten buses has already commenced, five of them having reached Montreal from Chicago last week. The buses have a seating capacity of 34 passengers each as compared with the 29-passenger type now in service. Contract for the cars will be awarded shortly.

De Luxe Car Service for Washington & Baltimore Soon

Ten articulated cars recently ordered by the Washington, Baltimore & Annapolis Railroad are to be placed in service very shortly, according to a recent announcement made public by President J. J. Doyle. It is understood that five of the cars will be in operation by the end of February.

The new rolling stock, for which contracts were awarded the J. G. Brill Company and the Westinghouse Electric & Manufacturing Company, represent an outlay of $500,000. They will be the first of their type chosen for operation by any high-speed interurban line in America. As detailed in the JOURNAL for Jan. 22, page 165, the cars are connected or articulated by a center truck.

The decision to provide a new and exceptionally luxurious type of car for the patrons of the Washington, Baltimore & Annapolis line was made by officials of the company when it was realized that the advent of the beautifully finished and smooth riding buses attracted thousands of electric car riders to the auto coaches. It was then decided to furnish equal riding luxury on the electric cars, which, with traffic over a carefully guarded right-of-way and with rigidly maintained schedules capable of meeting any transportation demands, day or night, would afford the riding public the greatest degree of safety.

Rockford & Interurban to Order Seven New Interurban Cars

From official circles it is learned that the Rockford & Interurban Railway, Rockford, Ill., shortly will place contracts for seven new one-man interurban cars and that it will immediately convert two of its present interurban cars to the one-man type. Plans also call for rebuilding a third car along these lines in the near future. Delivery of the new rolling stock is set for May 1. Thus the information was incorrect which appeared in an article in the JOURNAL for Feb. 5, page 270, in which it was stated that ten cars had already been ordered by the company at a cost of $100,000. Recent advices raise this figure to $160,000 for the seven new cars.

Omaha Company Allots $80,000 for Trackwork

According to the annual forecast of the Omaha & Council Bluffs Street Railway several important improvements are contemplated for the coming year. Among them is the widening of the Q Street viaduct in South Omaha, which has just been ordered by the City Council. The cost of this project is estimated at $200,000, of which the company's proportion, including trackwork, will be about $36,000. Another item is the widening of Twentieth Street between Dodge and Harney Streets. This work is expected to cost in the neighborhood of $25,000 and will involve the realignment of tracks. Another improvement includes the expenditure of $30,700 for the repaving of Sixteenth Street between Farnam and Leavenworth Streets. Paving of Vinton Street between 24th and 25th in Omaha and the resurfacing of Broadway in Council Bluffs between First Street and Franklin Street are other contemplated improvements, for which the company estimates it will spend $15,000.

Giant Electric Engine Goes West for Great Northern

Great Northern Railway, St. Paul, Minn., will soon put into service in the Pacific Northwest a giant two-unit motor-generator electric locomotive recently completed jointly by the Baldwin Locomotive Works and the Westinghouse Electric & Manufacturing Company of East Pittsburgh. The locomotive is now being piloted through the Northwest states by T. E. McGettigan and E. R. Randolph, making stops at the principal cities, perhaps going as far as Vancouver, B. C., for exhibition purposes. The locomotive weighs 715,000 lb. and is 94 ft. 4 in. long over all between faces of buffers.

The motive-power will operate on the Great Northern line between Skykomish and the summit of the Cascades on the Everett-Wenatchee division, and later, when the new Cascade tunnel is ready, will haul trains through the 7¾-mile bore.

Orders for Electrical Goods Increase

New orders booked during the fourth quarter of 1926, as reported to the Department of Commerce by 72 manufacturers of electrical goods, were $246,711,426 as compared with $229,423,549 for the third quarter of 1926 and $234,871,751 for the fourth quarter of 1925. The total bookings for 1926 for these concerns were $963,852,642, as compared with $900,985,980 in 1925.

Rolling Stock

Springfield Street Railway, Springfield, Mass., and **Worcester Consolidated Street Railway, Worcester, Mass.,** have completed specifications and will shortly call for bids on approximately 100 new cars of the one-man, two-man type.

Fitchburg & Leominster Street Railway, Fitchburg, Mass., has recently ordered four double-truck safety cars from J. G. Brill Company. The specifications include Brill 117-E trucks.

J. G. Brill Company, Philadelphia, Pa., has received an order for five 50-ft. 6-in. passenger and smoking car motor bodies from the Philadelphia & Western Railway, Philadelphia, Pa. The bodies will be mounted on Brill 27 M.C.B. trucks.

Portland Electric Power Company, Portland, Ore., has received a new six-cylinder Mack bus with street car body for use on the bus line to Marquam Hill.

Phoenix Municipal Railway, Phoenix, Ariz., will purchase a number of new cars if the voters on March 12 approve a program calling for the expenditure of $175,000 in rehabilitating the property.

Fageol Company, Kent, Ohio, reports the delivery of eleven coaches, type DD to the Department of Street Railways, City of Detroit, Mich. All the coaches are equipped with Westinghouse air brakes.

Track and Line

Tidewater Power Company, Wilmington, N. C., owned by the Fitkin interests, will reconstruct its line between Wilmington and Wrightsville Beach, North Carolina, at a cost of approximately $50,000. The project will include the relaying of 32,000 ft. of new and heavier rail. Charles Brooks, general manager railways for the company, has charge of the work, which is scheduled to begin about March 1. Wrightsville Beach is North Carolina's leading ocean resort and the new line will double the service capacity.

Trenton & Mercer County Traction Corporation, Trenton, N. J., will commence shortly the construction of a loop in the Wilbur section of the city, the work having been approved by the Board of Public Utility Commissioners.

Wisconsin Public Service Corporation, Green Bay, Wis., has completed its budget for 1927, which calls for the expenditure of $1,680,000 for improvements and additions to its properties in Wisconsin. To improve its electric railway and bus properties, approximately $625,000 will be spent during 1927.

Tri-City Railway, Davenport, Ia., is installing a new trolley wire on Harrison Street. The wire is being strung from Second Street north to Eighth Street for use of the Vander Veer Park and Gaines Street line. The improvement will cost about $1,000.

Seattle Municipal Street Railway, Seattle, Wash., through its superintendent, D. W. Henderson, is urging the immediate reconstruction of Westlake Avenue car tracks, and has asked the Council utilities committee to make $55,000 available for the work at once. Rails and other materials worth more than $30,000 were purchased three years ago, but the railway fund has never been able to finance the installation. The project extends from Roy to Fulton Street. Mr. Henderson suggests that the $55,000 be appropriated as a loan from the depreciation reserve.

Shops and Buildings

Cincinnati, Hamilton & Dayton Railway, Dayton, Ohio, will erect eight new automatic stations between Dayton and Cincinnati at a total cost of $200,000. This is part of a $1,500,000 rehabilitation program which has just been launched.

Hartford & Springfield Coach Company is removing all steam and electrical equipment from the old power plant at Warehouse Point, Conn., and is installing automatic machinery for rebuilding and repairing buses for its own and other lines. Among the concerns to be served are the Interstate Buses Corporation, Long Island Coach Company and Colonial Coach Company of Newport, R. I. Carl Derr is superintendent of the maintenance operations.

Trade Notes

Rome Wire Company, Rome, N. Y., announces the opening of a new warehouse to serve the Detroit territory. Herman C. Jobs will be in charge of the new service station.

Universal Car Parts Corporation has just been organized in Baltimore, Md., for the purpose of manufacturing and installing car parts and accessories and having as its special product the "Universal joint coupler," of which Joseph M. Saurez is the inventor. The corporation will concentrate its energies and resources on introducing Mr. Saurez's invention, a two-ball coupler designed to take the shortest curves and most abrupt change of grades and lateral inclinations. Offices of the corporation will be at 6 East Mulberry Street, Baltimore, Md.

Tide Water Oil Sales Corporation has secured a yearly contract for gasoline from the Fifth Avenue Coach Company, the Yellow Taxi Cab Corporation, and the Hertz Driv-Ur-Self Sales Corporation. The probable amount of gasoline which will be used by these corporations for the year is between 16,000,000 and 20,000,000 gal.

ELECTRIC RAILWAY MATERIAL PRICES—Feb. 15, 1927

Metals—New York

Copper, electrolytic, cents per lb.	12.435
Lead, cents per lb.	7.425
Nickel, cents per lb.	35.00
Zinc, cents per lb.	7.00
Tin, Straits, cents per lb.	68.625
Aluminum, 98 or 99 per cent, cents per lb.	26.00
Babbitt metal, warehouse, cents per lb.:	
Commercial grade	61.00
General service	31.50

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$4.825
Somerset mine run, Boston	2.125
Pittsburgh mine run, Pittsburgh	1.85
Franklin, Ill., screenings, Chicago	2.05
Central, Ill., screenings, Chicago	1.875
Kansas screenings, Kansas City	2.50

Track Materials—Pittsburgh

Standard steel rails, gross ton	$43.00
Railroad spikes, drive, 9/16 in. and larger, cents per lb.	2.90
Tie plates (flat type), cents per lb.	2.35
Angle bars, cents per lb.	2.75
Rail bolts and nuts, cents per lb.	4.20
Steel bars, cents per lb.	1.90
Ties, white oak, Chicago, 6 in.x8 in.x8 ft.	$1.45

Hardware—Pittsburgh

Wire nails, base per keg	2.40
Sheet iron (24 gage), cents per lb.	2.80
Sheet iron, galvanized (24 gage), cents per lb.	3.70
Galvanized barbed wire, cents per lb.	3.25
Galvanized wire, ordinary, cents per lb.	2.40

Waste—New York

Waste, wool, cents per lb.	12–18
Waste, cotton (100 lb. bale), cents per lb.:	
White	13–17.50
Colored	10–14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), cents per lb.	10.80
White lead in oil (100 lb. keg), cents per lb.	14.51
Turpentine (bbl. lots), per gal.	$0 76
Putty, 100 lb. tins, cents per lb.	5.25–5 50

Wire—New York

Copper wire, cents per lb.	14 50
Rubber-covered wire, No. 14, per 1,000 ft.	$5.50
Weatherproof wire base, cents per lb.	16.75

Paving Materials

Paving stone, granite, 5 in. New York—Grade 1, per thousand	$142.40
Wood block paving 3½, 16 lb treatment, N. Y., per sq.yd.	$2.70
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	51 00
Paving brick 3x8½x4 N.Y., per 1,000 in carload lots	45.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.94
Cement, Chicago consumers' net prices, without bags	2 05
Gravel, ¾-in., cu.yd., f.o.b. N. Y.	1 75
Sand, cu.yd., f.o.b. N. Y.	1 00

Old Metals—New York and Chicago

Heavy copper, cents per lb.	10 50
Light copper, cents per lb.	9 25
Heavy brass, cents per lb.	6 7
Zinc, old scrap, cents per lb.	4 00
Lead, cents per lb. (heavy)	6 00
Steel car axles, Chicago, net ton	$17 25
Cast iron car wheels, Chicago, gross ton	15.75
Rails (short), Chicago, gross ton	16 75
Rails, (relaying), Chicago, gross ton (65 lb and heavier)	[illegible]
Machine turnings, Chicago, gross ton	7 25

"I cannot tell a lie—"

Were the father of Our Country alive today he would also state that most modern cars are equipped with

"PEACOCK" STAFFLESS BRAKES!

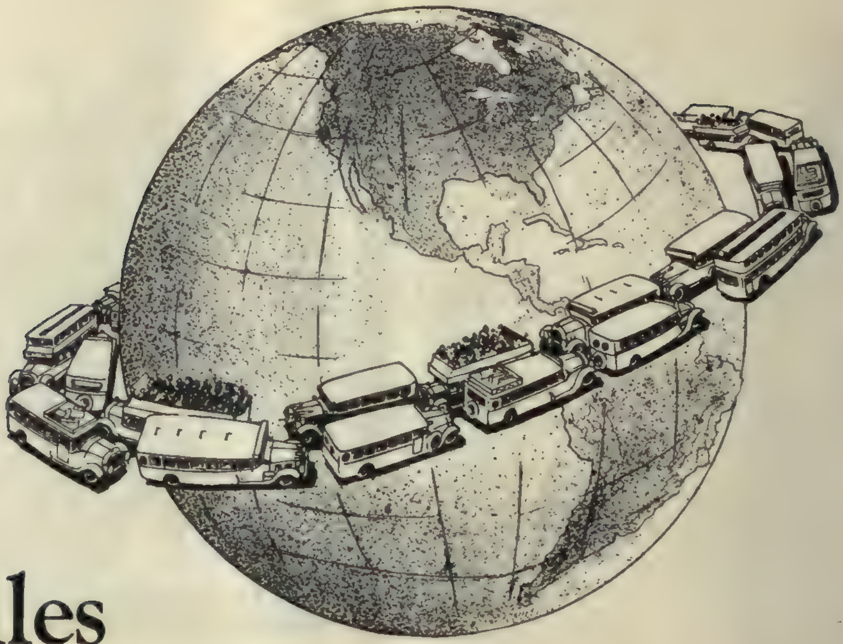
REG. U.S. PAT. OFF.

Light in weight, combined with tremendous braking power, low installation and maintenance cost, simplicity of operation and occupation of but little platform space, are a few of the factors which demand "Peacock" Staffless Brakes in modern car design.

There are other factors that especially adapt these brakes to the most modern cars. *May we tell you about them?*

National Brake Company, Inc.
890 Ellicott Square Buffalo, N. Y.

Canadian Representative:
Lyman Tube & Supply Co., Ltd., Montreal, Can.



Over a million miles on Budd-Michelin Dual Wheels *...without a holdup!*

O. W. Townsend, of the Cornhusker Stage Lines, Hastings, Nebraska, operates 21 buses equipped with Budd Duals. He says:

> *"We have operated these buses in excess of a million miles. We have never experienced a wheel failure nor have we ever replaced a wheel for ANY cause. Our past experience prompts us to continue specifying your equipment."*

That's dependability! And that's why all veteran bus owners *continue to specify* Budd Duals. They *know* what to expect from them.

BUDD
WHEEL COMPANY
Detroit

Quoted FROM
The Saturday Evening Post
Issue of Feb. 12, 1927

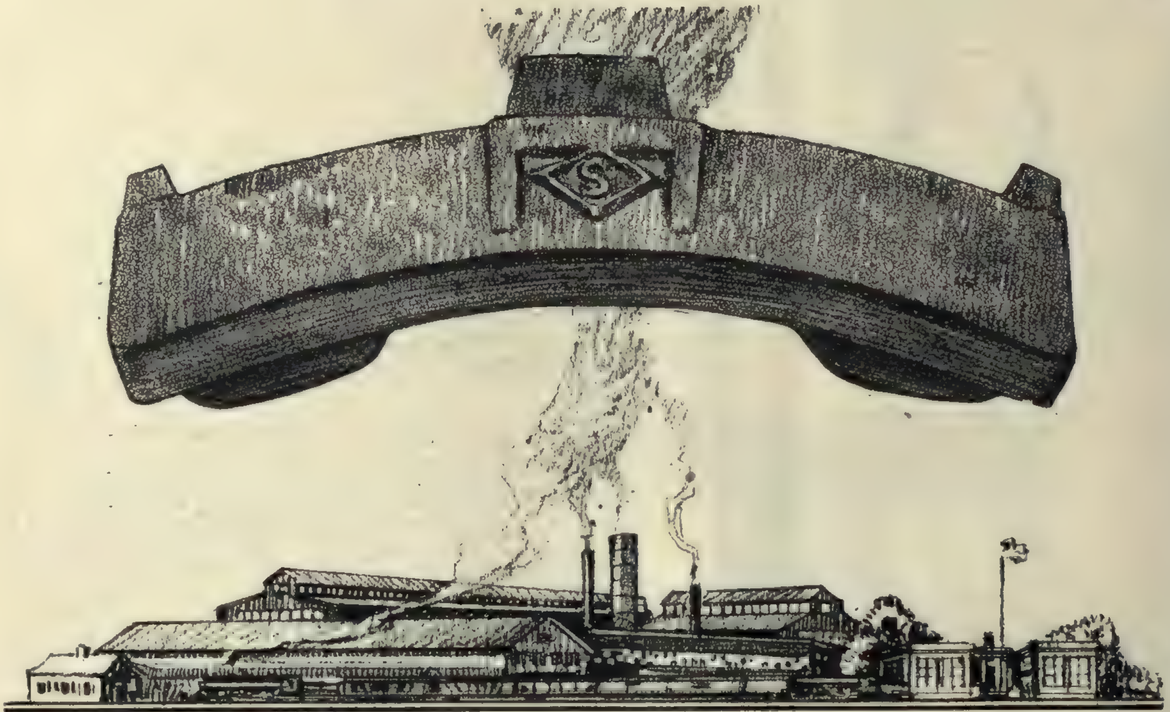
"What the great transportation companies of American cities are accomplishing by co-ordinated service, is typified by P. R. T. Here you have everything from airplanes to subways, under Mitten Management, giving the public the savings in cost, the improvements in service, due to co-ordination of street cars, taxicabs, motor coaches and buses, subways, elevated lines, airplanes . . . On all P. R. T. Coaches and Buses, as well as on the first passenger air service in America, P. R. T. uses tires built by Goodrich."

* * *

A great message to almost three million representative people! A clear exposition of the good work of co-ordination—placed before nearly three million voters, city officials, users of transportation—three million, whose thought shapes public opinion!

THE B. F. GOODRICH RUBBER COMPANY
Akron, Ohio
In Canada: Canadian Goodrich Company, Kitchener, Ontario

Goodrich
HEAVY DUTY
Silvertowns
HIGH PRESSURE OR BALLOON



MAJOR WORK ON MINOR DETAILS

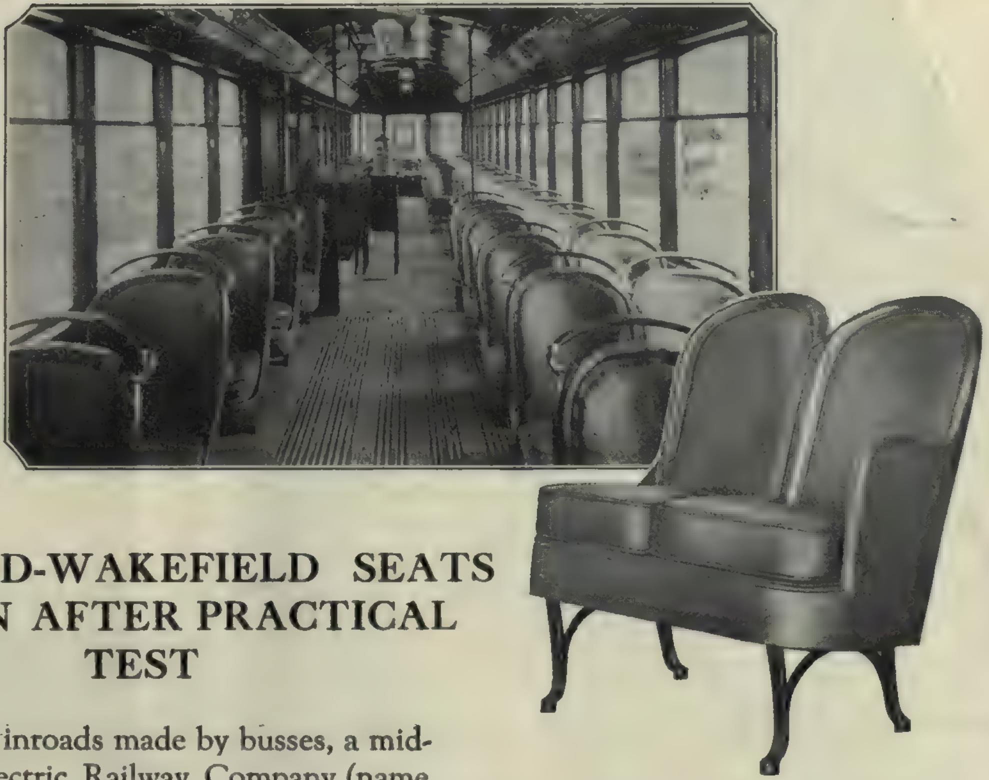
IF brake shoes were a by-product we could not spend much time on details of design and fine points of manufacture. With brake shoes our main product, however, each minor detail becomes of major importance and, with so many shoes produced each year, we can well afford to devote the best engineering brains to their perfection. The American Brake Shoe and Foundry Company has put more work *into* brake shoes than any other organization or group of organizations in the world. It is, therefore, only natural that you should get more work *out* of them.

THE AMERICAN BRAKE SHOE AND FOUNDRY COMPANY

30 CHURCH ST., NEW YORK
332 SO. MICH. AVE., CHICAGO

101 YEARS OF MANUFACTURING EXPERIENCE

Snow sweeper rattan and cane webbing may be ordered through any H-W sales office.



HEYWOOD-WAKEFIELD SEATS CHOSEN AFTER PRACTICAL TEST

TO offset the inroads made by busses, a midwestern Electric Railway Company (name on request) determined to increase the attractiveness and comfort of its cars. Sample cars, equipped by three seat manufacturers, were operated in a six months' practical service test.

The above installation of our seat No. 55-P, without arm rest and with attractive grip rail, was selected by the public and the company as the most handsome, comfortable and practical.

Our car seating experts will be glad to help in selecting the seats best suited to your needs. This service is free, without any obligation on your part, through any Heywood-Wakefield sales office.

If you have not received a copy of our new Bus Seat Catalogue, write for it.

Heywood-Wakefield

REG. U.S. PAT. OFF.

Heywood-Wakefield Co., Wakefield, Mass.
Heywood-Wakefield Co., 516 West 34th St., New York, N. Y.
Heywood-Wakefield Co., 439 Railway Exchange Bldg., Chicago, Ill.
Frank N. Grigg, 630 Louisiana Ave., Washington, D. C.
Herbert G. Cook, Hobart Bldg., San Francisco, Calif.
The G. F. Cotter Supply Co., Houston, Texas
The Railway and Power Engineering Corporation,
133 Eastern Ave., Toronto; Montreal; Winnipeg, Canada

One of the 100%-Goodyear-equipped motorbus fleet of Chicago and West Towns Railway Company

GOODYEAR

Copyright 1927, by The Goodyear Tire & Rubber Co., Inc.

"Gladly recommend them to anyone using tires"

Chicago and West Towns Railway Company operates 22 motorbuses in connection with its electric railway service through the populous and growing communities that border Chicago on the West.

Each bus travels from 61 to 189 miles a day, the usual running fleet of 19 of them covering about 2600 miles a day and carrying more than 9300 passengers.

All of them are equipped with Goodyear Pneumatic Bus Tires.

* * *

"We have records of any number of Goodyears that have gone over 35,000 miles in our service," writes Mr. C. N. Hebner, Secretary of the Company.

"In checking back our records, I find that we have discarded 20 tires that the register shows averaged 36,695 miles.

"I also wish to say that the service we have received from the Goodyear people has been exceptionally good. They have always been ready to co-operate with us so that we would get the proper service out of the tires we were using. I can gladly recommend them to anyone using tires."

* * *

In urban, suburban and highway service of all kinds, Goodyear Pneumatic Bus Tires make records for durability, for cushioning, and for dependable performance at low cost per tire-mile.

Goodyear Tires are made with SUPERTWIST, the extra-elastic, extra-enduring cord fabric developed by Goodyear for Goodyear Tires.

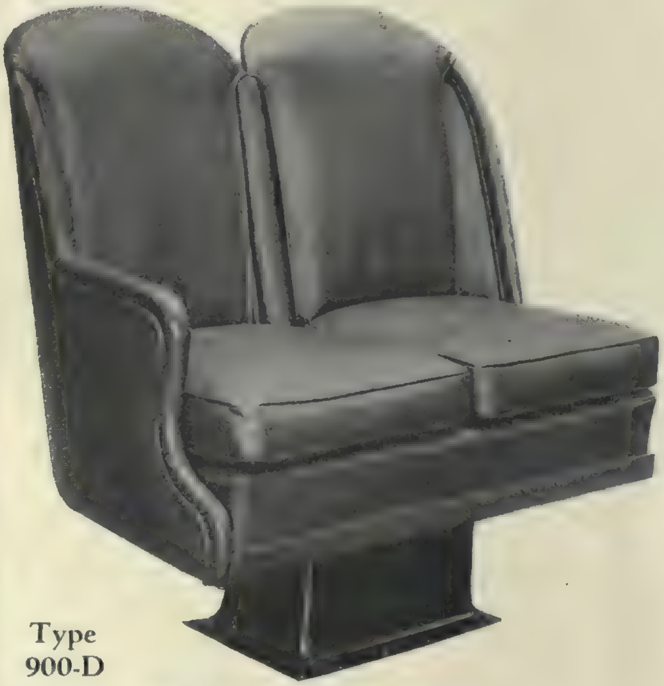
Goodyear Tires, made with the famous All-Weather Tread for tractive power and with SUPERTWIST for great durability, give more in results—yet they cost you no more.

More people ride on Goodyear Tires than on any other kind

BUS TIRES

Made with SUPERTWIST

An investment in good will



Type 900-D

Shown above is the single-end car type. For double-end cars the chair has another arm and a rotating base. Upholstered in leather or fabric, the 900-D has air and spring cushion pads. Can be made with leg support instead of Hollow Steel Base as shown

With so much competition in travel vehicles, passengers expect and demand comfortable riding facilities. Buses and railway cars can no longer furnish hard unyielding seats and expect to hold their passengers' goodwill.

Each Hale-Kilburn seat is designed primarily for passenger comfort. Seats are more restful, backs are at the proper angle. At the same time they are lighter, stronger and more graceful than ever before.

Passengers appreciate Hale-Kilburn comfort, and the difference shows up in cold cash.

Make sure your lines are H-K equipped. May we send the catalog?

HALE-KILBURN COMPANY
General Offices and Works: **1800 Lehigh Avenue, Philadelphia**

SALES OFFICES:

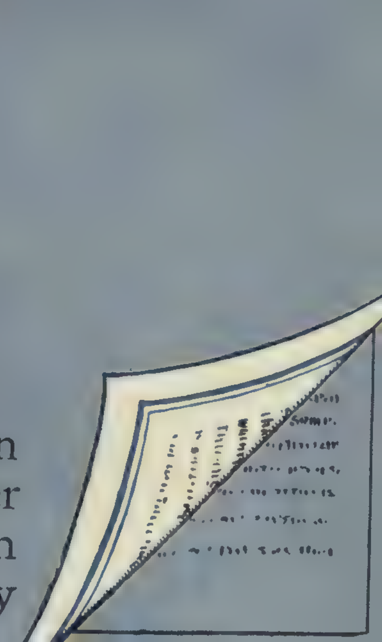
Hale-Kilburn Co., 30 Church St., New York
Hale-Kilburn Co., McCormick Bldg., Chicago
E. A. Thornwell, Candler Bldg., Atlanta
Frank F. Bodler, 903 Monadnock Bldg., San Francisco
Chas. Eccles, 320 S. San Pedro St., Los Angeles

T. C. Coleman & Son, Starks Bldg., Louisville
W. L. Jefferies, Jr., Mutual Bldg., Richmond
W. D. Jenkins, Praetorian Bldg., Dallas, Texas
H. M. Euler, 46 Front St., Portland, Oregon

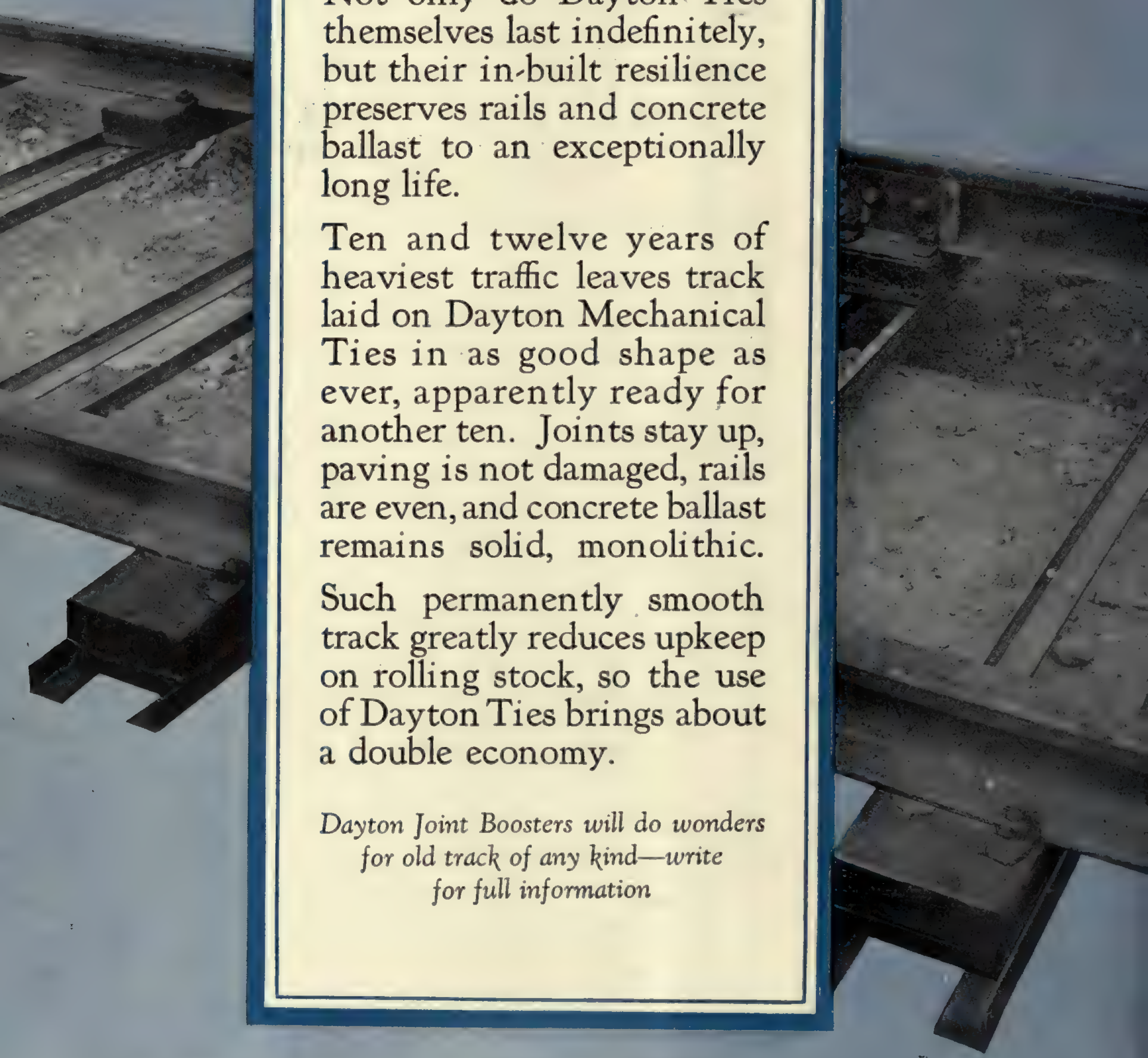
Hale and Kilburn SEATS

Street Railways In

127 Cities Now Use Dayton Mechanical Ties



The 127 cities having installations of Dayton Mechanical Ties are spread not only all over the United States, but into Canada and foreign countries. Everywhere electric railway



operators are recognizing Dayton phenomenal merit.

Not only do Dayton Ties themselves last indefinitely, but their in-built resilience preserves rails and concrete ballast to an exceptionally long life.

Ten and twelve years of heaviest traffic leaves track laid on Dayton Mechanical Ties in as good shape as ever, apparently ready for another ten. Joints stay up, paving is not damaged, rails are even, and concrete ballast remains solid, monolithic.

Such permanently smooth track greatly reduces upkeep on rolling stock, so the use of Dayton Ties brings about a double economy.

Dayton Joint Boosters will do wonders for old track of any kind—write for full information

The Dayton Mechanical Tie Co.,
Dayton, Ohio.

Users' records all over the country prove that General plays no favorites in rolling up big mileage ~~

Better Buy Generals NOW than buy and buy

The GENERAL TIRE

—goes a long way to make friends

BUILT IN AKRON, OHIO, BY THE GENERAL TIRE AND RUBBER CO.

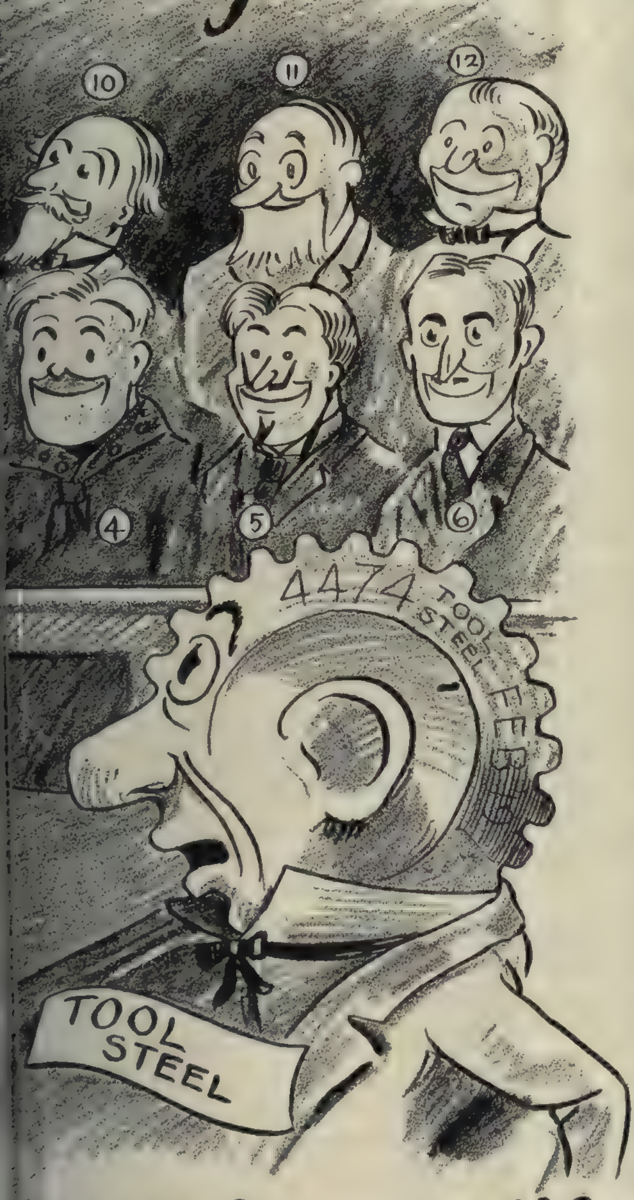
The Jury
in the

and gives Mr. "To
work an

TOOL-
GEARS

The Standard of Quality

renders a verdict of "Guilty" case of Mr. "Tool Steel" Gear



The Judge Hears the Report of the Jury—

1. A.E.R.A. Equipment Committee—82% are "Tool Steel" gear users.
2. A.E.R.A. Question Box finds "Tool Steel" best.
3. Electric Traction Trophy Winner used "Tool Steel" gears in winning car.
4. Western Canada is unanimous in favor of "Tool Steel" gears.
5. Europe says no other American manufacturer touches "Tool Steel."
6. South America is almost exclusively "Tool Steel."
7. Australia is buying "Tool Steel" heavily for new British made motors.
8. Ohio, the home state is practically unanimous in selecting "Tool Steel."
9. C.E.R.A. Master Mechanic Officers are 82% "Tool Steel" users.
10. Southern Equipment Men praise "Tool Steel" highly.
11. Holland specifies "Tool Steel" gears when buying German motors.
12. A.E.R.A. Equipment Committee Questionnaire answers were from Companies, 88% of whom used "Tool Steel" gears.

The Tool Steel Gear & Pinion Company
Cincinnati, Ohio

Steel" Gear a life sentence of hard continuous service.

STEEL QUALITY
AND PINIONS

COMING . . .

the most complete

Annual MAINTENANCE *Number*

Dated March 19

Ever published by
ELECTRIC RAILWAY JOURNAL

The greatest maintenance year in the electric railway industry is assured.

With the economies and profit making possibilities of new cars firmly established operators all over the country are turning their attention to "Maintenance for the Car Rider."

The appearance of the car, its cleanliness, its smooth uninterrupted operation, the condition of the track, right of way and overhead, all are contributing factors to public good will and increased patronage.

Millions of dollars will be spent this year for shops, for machines, tools and maintenance equipment and supplies.

Electric railway men are looking eagerly for equipment to increase efficiency, they are seeking tools and devices which make transportation service more attractive, they are intensely interested in equipment that will help them render modern transportation service.

They will look for the latest information on the whole range of maintenance work in the Annual Maintenance Number of *Electric Railway Journal.*

For more than a generation this issue has been a handbook of maintenance fact. This year's issue will contain the greatest gathering of vital information under one cover on this important subject ever published.

The editorial pages will focus attention on the most modern practices in shop construction and operation and the most effective policies of track construction and the most reliable methods of line maintenance.

The advertising pages will focus attention on the leading devices, tools, machines and equipment needed in modern maintenance work.

An entire industry needs and wants manufacturers' assistance. Tell them through an issue that reaches the industry when spring plans are being considered.

Last forms close March 12

Write or wire your reservation.

ELECTRIC RAILWAY JOURNAL
Tenth Avenue at 36th Street, New York

ANNUAL MAINTENANCE ISSUE

An increasingly large portion of the actual income derived from car card advertising service must be devoted to building and maintaining the prestige of car card advertising in the face of the active competition of all other media.

Creating and protecting our mutual interest is a costly item.

Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK

You are your Credit Man When it comes to Buying Orders

THE orders you take come under the watchful eye of the credit man.

How about the orders your company places—the orders that you make?

If the reliability of the manufacturer is checked when you sell it should be checked when you buy.

Whether his is a dependable source of purchase is important to learn before—not after his products are in your plant.

What can you expect in the way of prompt and continuous deliveries?

What about quality uniformity?

Has he the ability to finance your orders?

* * *

A reliable aid is here—in this publication. Most of the manufacturers in this issue have been running their advertising in this publication continuously year after year.

They are established. They do not advertise something they cannot deliver. They cannot deliberately exaggerate product merit or institutional service.

Why? Because this publication is A.B.P.—meaning it is a member of the Associated Business Papers. This means, broadly, that this publisher has that basic A.B.P. requirement—integrity.

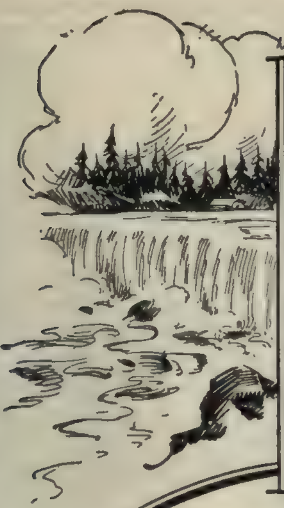
If a product you need is not advertised in this publication, ask the publisher to direct you to a reliable source.

This publication is a member of

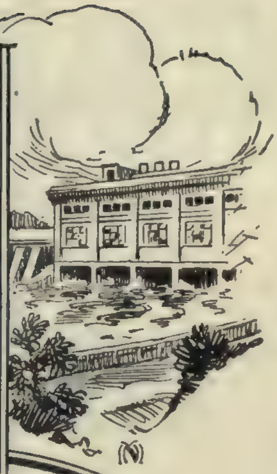
The ASSOCIATED BUSINESS PAPERS, Inc.

An association of none but qualified publications reaching the principal fields of trade and industry

Executive Offices: 52 Vanderbilt Ave., New York, N. Y.



Lubrication and Machinery



When you select a piece of machinery for use in your plant, you naturally choose one that is made by a dependable manufacturer, and which you believe to be constructed of the highest grade materials. You make your selection carefully, because you know that if the machine should break down, or if an undue amount of repair work were necessary to keep it in running condition, your production costs would be increased and your output diminished.

Do you choose your lubricants with the same care that you would use in selecting an expensive piece of machinery? The lubricant is just as important as the machine, for the service you receive from the machine depends upon the quality and grade of the oil or grease with which it is lubricated.

Standard Oils and Greases

are lubricants of the highest quality, and are made in grades suited to all machinery now in use in the industrial world.

Standard Oils and Greases will help you to cut production costs and to maintain the output of your plant at the highest point. They reduce friction, save power and lower depreciation and repair expense.

Our representative is familiar with the lubrication requirements of modern industrial machinery, and will recommend the grades suited to your equipment.

STANDARD OIL COMPANY
(INDIANA)
910 South Michigan Avenue Chicago, Illinois

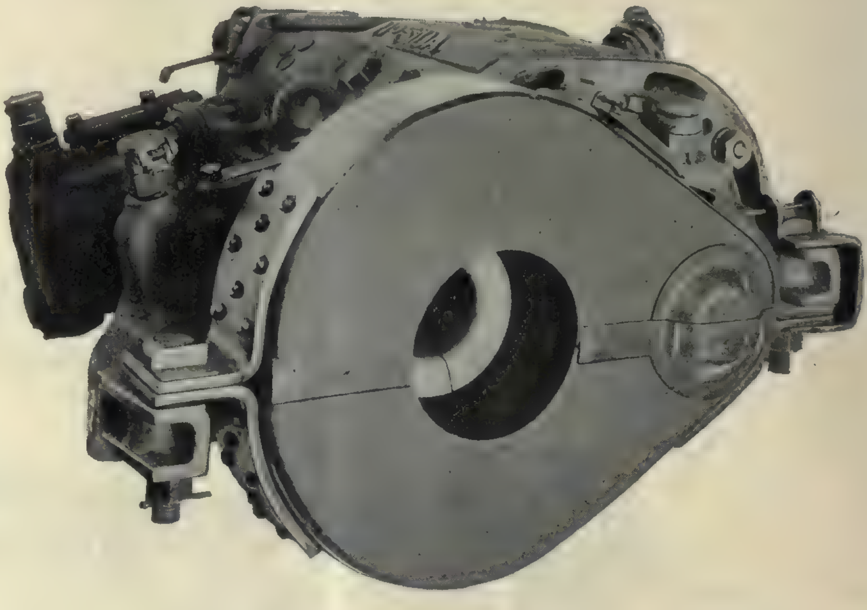
DO NOT BE TOO OPTIMISTIC!!

AND think that if you merely specify "H.B. LIFE GUARDS" in your specifications for new cars that you will surely get the H.B. Life Guards which you have always used. Make sure of getting the *genuine* H.B. Life Guard by specifying that they be *manufactured by* the Consolidated Car Fender Company, who have been manufacturing these guards for many years, and due to their high standard of workmanship and material, which they never sacrifice to expediency or cost, may be depended upon to furnish you with guards that will be low in maintenance and high in efficiency, because they are *built right* of sound *materials* and *good workmanship.*

THE CONSOLIDATED CAR FENDER COMPANY
PROVIDENCE, R. I.

Wendell & MacDuffie Co., General Sales Agents
110 East 42nd St., New York, N. Y.

For lightness—strength—low maintenance



GEAR CASE
FOR W. H. 510
MOTOR

CHILLINGWORTH ONE-PIECE GEAR CASE

REPRESENTATIVES:

J. W. Gerke, New York
Railway & Power Eng. Co., Canada
Croyden Eng. Co., England
E. Lewis Sales Co., Des Moines, Ia.
G. W. Wagner, Detroit, Mich.
Bernard Rowntree—San Francisco, Calif.

ACME

Varnished Insulations

are made from long-staple cotton yarns—finest Japanese silk—or special tested papers. The varnish, made from high-grade vegetable oils, is applied under accurate heat control. The result is—extreme flexibility, wide dielectric reserve, and resistance to acid, oil, moisture and gases. The line comprises:—

Varnished Cambrics

—black and yellow, in standard 50-yard rolls, 35 to 36 inches wide, 1½" inch core tube, ends paraffined. Also in 25 or 100-yard rolls if desired. Thicknesses, from .004" to .015" and in other fabrics up to .030." Standard finish, dry; optional, tacky or waxy.

Varnished Cambric Tapes

—black and yellow, cut straight or bias, sewed or seamless. 72-yard standard rolls; others to order. Widths, ⅛" up. Standard core 1½"; .005" to .015" thicknesses. Standard finishes: yellow, dry; black, greasy. The bias tapes have 48 closely stitched seams in a standard roll.

Varnished Silks and Tapes

Color, yellow. Cut straight, 25- or 50-yard rolls untrimmed, 1½" paper cores; cut bias, 45 deg. angle, in 50" strips, 200 to the package. Widths, ¼" to 36". Dry and slightly tacky finishes .002" to .008" thicknesses.

Varnished Papers

—black and yellow, in standard 50-yard rolls, 36" wide, ends paraffined. Tapes ¼" wide and up. Thicknesses, .0006" to .020". Dry, tacky or greasy finishes.

Varnished Tubing

Standard colors, yellow, black, red, green and brown. Standard 30" lengths; 24" to 36" lengths to order. Sixteen sizes, inside diameter .042" to .295". Dielectric voltages from 2,500 to 5,000. (Also special tubings for voltages up to 30,000.)

Write for Catalog 3J.

Acme Wire Products

The Acme Wire Co., New Haven, Conn.

Branches at

New York, 52 Vanderbilt Ave.
Boston, 80 Federal St.
Chicago, 427 West Erie St.
Cleveland, Guardian Bldg.

Nuttall

and

Timken!

Nuttall US 20A Trolley Base
Equipped with Timken Tapered Roller Bearings

Two old-time names in which the public has a lot of confidence. Both companies make products in which the public has had a lot of confidence for a long time. Just try to imagine how many people are riding on Timken Bearings and under Nuttall Trolleys right today.

And now the Nuttall US20A trolley is equipped with Timken Swivel Bearings—and that settles the bearing question—the friction question.

It is also equipped with a system that settles the lubrication question—fill the reservoir about twice a year, and forget it.

It is equipped with 1000 Ampere Capacity Shunts and that settles the arcing question.

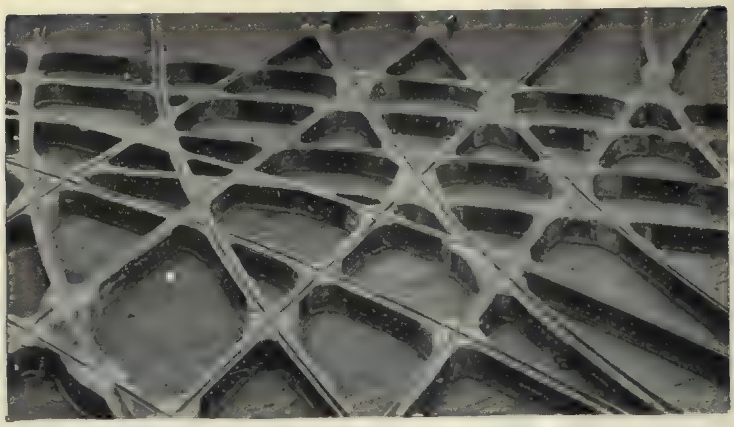
Now Nuttall settles another question—the price question.

Send for specifications and proposition

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

Nuttall



THE STANDARD IN TRACKWORK FOR NEARLY FIFTY YEARS

BUDA
ESTABLISHED
1881

Send us your Inquiries

THE BUDA CO. HARVEY, ILL.

HASKELITE

Do you patch your cars, or recondition them?

PATCHED cars only delay the inevitable and patching often causes premature junking of cars that by proper reconditioning could have been made to give many years of additional life.

In the reconstruction of an old car, ultimate economy dictates the use of the latest ideas in design and materials.

HASKELITE and PLYMETL most closely meet the requisites for the perfect roof, floor and side panels. Light weight and great strength are the outstanding characteristics of these materials. There is exactly the same need for cutting the dead load and increasing the factor of safety in reconditioned cars as in new ones.

Before overhauling any more cars, send for our booklet on the application of HASKELITE and PLYMETL to electric railway car construction.

PLYMETL

HASKELITE MANUFACTURING
CORPORATION
133 W. Washington Street
CHICAGO, ILLINOIS

Canadian Representatives:
Railway and Power Engineering Corp., Ltd.
Montreal Toronto Winnipeg

The Price Goes Up!

Croft's Library of
PRACTICAL ELECTRICITY
will soon cost $23.50

You have no doubt planned to get Croft's great LIBRARY OF PRACTICAL ELECTRICITY for yourself some time. Get it now and save yourself $4.00. Manufacturing and distribution costs make it necessary to raise the price to $23.50. Act now before the price goes up!

Croft's Library of
PRACTICAL
ELECTRICITY

A combined reference library and home study course in practical electricity.

Croft tells you the things you need to know about motors, generators, armatures, commutators, transformers, circuits currents, switchboards, distribution systems—electrical machinery of every type, its installation, operation and repair—wiring for light and power—how to do it mechanically perfect, in accordance with the National Electrical code—wiring of finished buildings—underwriters' and municipal requirements—how to do a complete job, from estimating it, to completion—illumination in its every phase—the latest and most improved methods of lighting—lamps and lighting effects, etc.

Examine it free!
Send no money!

Fill in and mail the coupon attached and we will send you the entire set of eight volumes for ten days' Free Examination. We take all the risk—pay all charges. You assume no obligation—you pay nothing unless you decide to keep the books. Then $1.50 in ten days and the balance at the rate of $2.00 a month. Send the coupon NOW and see the books for yourself!

Mail this coupon now!

McGRAW-HILL
FREE EXAMINATION COUPON

McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York.

Gentlemen:—Please send me the *Croft Library of Practical Electricity* (shipping charges prepaid) for 10 days' free examination. If satisfactory, I will send $1.50 in ten days, and $2.00 a month until the special price of $19.50 has been paid. If not wanted I will write you for return shipping instructions. (Write plainly and fill in all lines.)

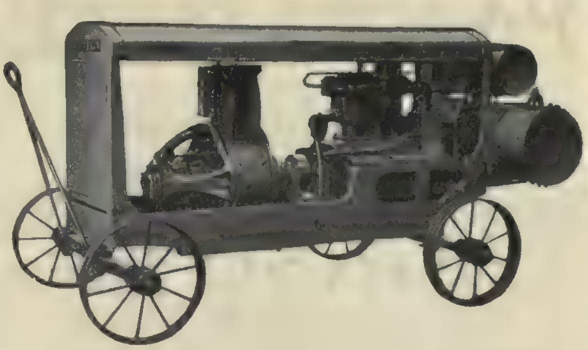
Name ....

Home Address ....

City and State ....

Employed by ....

Occupation ....E. 2-19-27



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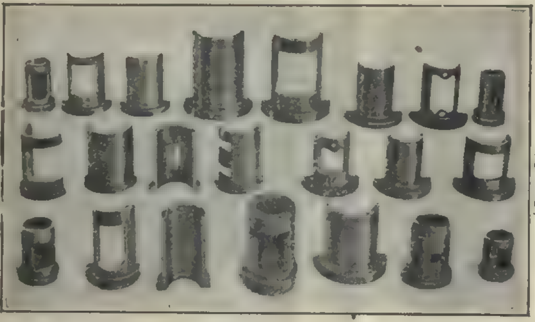

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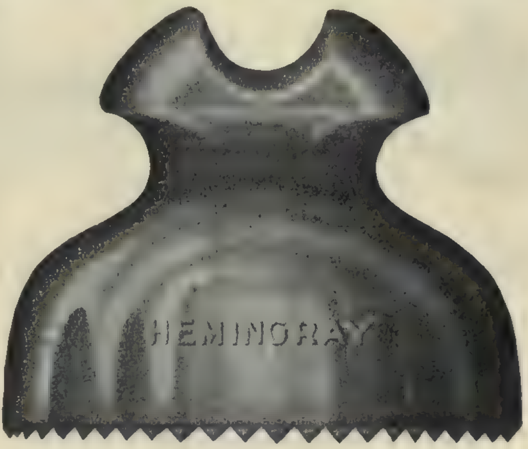

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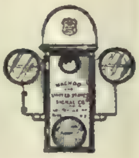

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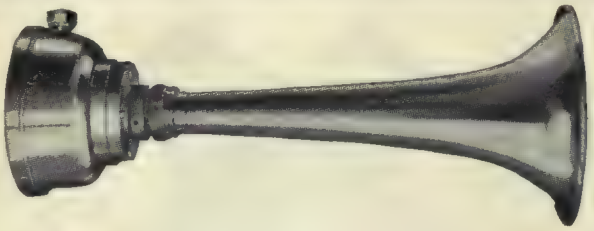

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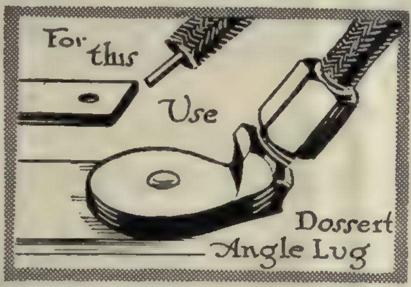

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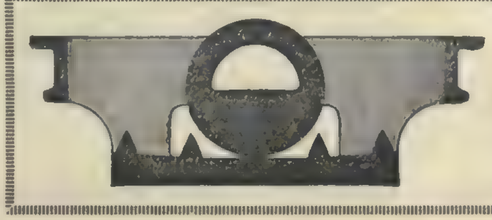

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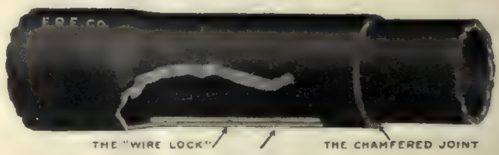

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Bearings, Center and Roller Side
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Stucki Co., A.

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Hyatt Roller Bearing Co.

Bearings, Roller and Ball
Timken Roller-Bearing Co.

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Consolidated Car Heating Co.

Bells and Gongs
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Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.

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Railway Trackwork Co.

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Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
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Westinghouse E. & M. Co.

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Duff Mfg. Co.

Braces, Trench
Duff Mfg. Co.

Brackets, Hand Rail
Columbia Machine Wks.

Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
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Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

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Brake Testers
National Railway Appliance Co.

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Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
General Electric Co.
National Brake Co.
Westinghouse Traction Brake Co.

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Cincinnati Car Co.

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General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Westinghouse E. & M. Co.

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Columbia Machine Works & M. I. Co.

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Bus Lighting
National Railway Appliance Co.

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Brill Co., The J. G.
Cummings Car & Coach Co.
Studebaker Corp. of Amer.

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Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.

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Consolidated Car Heating Co.
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Cincinnati Car Co.

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Bethlehem Steel Co.

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Brill Co., The J. G.
Differential Steel Car Co.

Cars, Gas-Electric
Brill Co., The J. G.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

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Brill Co., The J. G.

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Brill Co., The J. G.
Cincinnati Car Co.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
Wason Mfg. Co.

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Electric Equipment Co.

Cars, Self-Propelled
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General Electric Co.

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American Steel Foundries
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
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American Brake Shoe & Fdry.
Bemis Car Truck Co
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Earll, C. I.
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Wood Co., Chas. N.

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Pantasote Co., Inc.

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Haskelite Mfg. Corp.

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Cleveland Fare Box Co.
Electric Service Supplies Co.

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General Electric Co.
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General Electric Co.
Hubbard & Co.
Ohio Brass Co.
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Cincinnati Car Co.
Ohio Brass Co.

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General Electric Co.

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Westinghouse E. & M. Co.

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Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

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Illinois Motive Equipment Co.

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Cleveland Fare Box Co.
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Compressors, Air, Portable
Sullivan Machinery Co.

Compressors, Gas
Sullivan Machinery Co.

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Dossert & Co.
Westinghouse E. & M. Co.

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Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

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International Steel Tie Co.

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Wm. Wharton, Jr. & Co., Inc.

Crossing Manganese
Bethlehem Steel Co.
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Wm. Wharton Jr. & Co., Inc.

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Westinghouse E. & M. Co.

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Electric Service Supplies Co.

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Wish-Service, P. Edward

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Cincinnati Car Co.
General Electric Co.
Hale-Kilburn Co.

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Sullivan Machinery Co.

Drills, Track
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Railway Trackwork Co.

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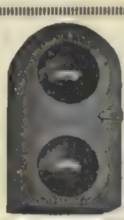

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Metal & Thermit Corp.

Rails, Steel
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Carnegie Steel Co.

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Metal & Thermit Corp.
Railway Trackwork Co.
Una Welding & Bonding Co.

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Westinghouse E. & M. Co.

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Strain, Insulators
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(Continued on page 58)

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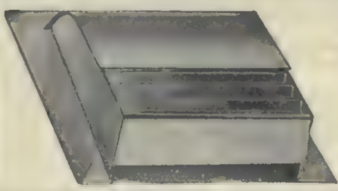

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ALPHABETICAL INDEX TO ADVERTISEMENTS

Page
Acme Wire Co., The.......... 41
Ahlberg Bearing Co......Insert 14
American Brake Shoe &
  Foundry Co.................. 26
American Brass Co., The....... 53
American Bridge Co........... 50
American Car Co............. 57
American Electrical Works..... 53
American Insulating Mach. Co.. 53
American Spiral Spring &
  Mfg. Co.................... 47
American Steel Foundries...... 6
American Steel & Wire Co...... 50
American Strombos Co......... 46
Anaconda Copper Mining Co... 53
Archbold-Brady Co........... 49

Babcock & Wilcox Co......... 49
Bayonet Trolley Harp Co...... 44
Beeler Organization, The...... 48
Bemis Car Truck Co.......... 55
Bethlehem Steel Co........... 50
Bridgeport Brass Co.......... 10
Brill Co., The J. G........... 57
Buchanan & Layng Corporation. 48
Buda Co., The............... 42
Budd Wheel Co.............. 24
Byllesby Engineering &
  Management Corp........... 48

Cameron Electric Mfg. Co...... 49
Carnegie Steel Co............ 47
Chillingworth Mfg. Co........ 40
Cincinnati Car & Coach Co.... 17
Clark-Williams Engineering Co.. 46
Cleveland Fare Box Co., The... 49
Collier, Inc., Barron G........ 37
Columbia Machine Works
  & M. I. Co., The........... 45
Consolidated Car Fender Co., The 40
Consolidated Car Heating Co.... 55
Cummings Car & Coach Co.... 8

Day & Zimmermann, Inc...... 48
Dayton Mechanical Tie Co.,
  The ....Insert 31-32

Page
Differential Steel Car Co., The.. 55
Dossert & Co................ 47
Drum & Co., A. L............ 49
Duff Mfg. Co., The........... 49

Earll, C. I................... 45
Eastern Mass. St. Ry. Co...... 51
Electric Equipment Co........ 51
Electric Railway Equipment Co. 50
Electric Service Supplies Co.... 7

Ford, Bacon & Davis, Inc....... 48
Ford Chain Block Co......... 44
"For Sale" Ads.............. 51

General Electric Co.........21-22
General Tire & Rubber Co.,
  The ....33, Back Cover
Godwin Co., Inc., W. S......... 49
Gold Car Heating & Ltg. Co.... 55
Goodrich Rubber Co., The B. F.. 25
Goodyear Tire & Rubber Co.,
  The 28-29

Hale-Kilburn Co............. 30
Haskelite Mfg. Corp.......... 42
"Help Wanted" Ads........... 51
Hemingray Glass Co.......... 45
Hemphill & Wells 48
Heywood-Wakefield Co........ 27
Holst, Englehardt W.......... 48
Hubbard & Co. 55
Hyatt Roller Bearing Co....... 18
Hyman-Michaels Co.......... 51

Illinois Motive Equipment Co.. 49
International Register Co...... 53
International Steel Tie Co.,
  Front Cover

Page
Irvington Varnish & Insulator
  Co. 53

Jackson, Walter 48
Jeandron, W. J.............. 47

Kelker, DeLeuw & Co......... 48
Kuhlman Car Co............. 57

Le Carbone Co............... 47
Linn & Marshall, Inc.......... 48
Lorain Steel Co., The......... 50

McCardell Co., J. R.......... 46
McClellan & Junkersfeld 48
McGraw-Hill Book Co., Inc.... 43
Metal & Thermit Corp........ 20
Mica Insulator Co........... 44

Nachod and United States Signal
  Co., Inc. 46
National Brake Co., Inc....... 23
National Pneumatic Co........ 15
National Railway Appliance Co. 50
Naugle Pole & Tie Co......... 53
Nichols-Lintern Co., The...... 55
Nuttall Co., R. D............. 41

Ohio Brass Co............... 5
Okonite-Callender Cable Co., Inc.,
  The 53
Okonite Co., The............ 53

Pantasote Co., Inc., The........ 44
Perey Mfg. Co., Inc........... 55
Positions Wanted and Vacant.. 51

Page
Railway Track-work Co....... 4
Railway Utility Co........... 55
Ramapo-Ajax Corp. 55
Richey, Albert S............. 48
Roebling's Sons Co., John A... 49

Salzberg Co., Inc., H. E........ 51
Samson Cordage Works........ 53
Sanderson & Porter 48
Searchlight Section 51
Smith Heater Co., Peter....... 49
Standard Oil Co............. 39
Standard Steel Works Co...... 19
Star Brass Works............ 55
Stevens & Wood, Inc......... 48
Stone & Webster, Inc......... 48
Stucki Co., A................ 49
Studebaker Corp. .....Insert 12-13
Sullivan Machinery Co........ 43

Texas Co., The.............. 16
Tool-Steel Gear & Pinion Co..34-35

Una Welding & Bonding Co.... 49
Universal Lubricating Co...... 55

Van Loan Corp., Irving S...... 51

"Want" Ads 51
Wason Mfg. Co.............. 57
Waukesha Motor Co.......Insert 11
Westinghouse Electric & Mfg.
  Co. 2
Westinghouse Traction Brake Co. 9
Wharton, Jr. & Co., Wm....... 50
"What and Where to Buy"
  52, 54, 56
White Engineering Corp., J. G.. 48
Wish Service, The P. Edw...... 49
Wood Co., Chas. N............ 53

WHAT AND WHERE TO BUY—Continued from page 54

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail Special Track Work
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co Inc.

Telephones and Parts
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Trolley Wheels (See Wheels, Trolley)

Trolley Wire
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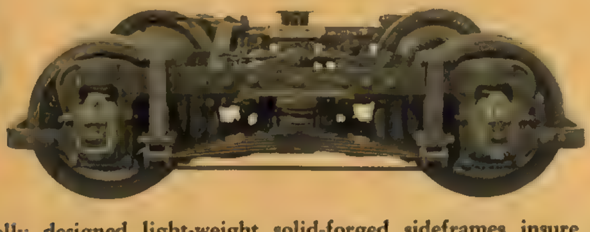

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Pages
365-404

CONTENTS

FEBRUARY 26, 1927

Editorials 365

A Seat Per Passenger Should Be Local Transportation Objective, Says T. E. Mitten 368
An Interview by CHARLES GORDON.
Some of us are trying to sell cotton goods in a silk age. The quality of local transportation service has not kept pace with the changing demand of the times. A constantly increasing standard of service at a fair price should be the objective of the industry.

Peter Witt Designs New De Luxe Car 370

Fitting the Bus to Its Proper Place in Urban Transportation 371
BY R. N. GRAHAM.
Experience shows that there is no mysterious urge to ride on rubber. Three miles is the limit to which buses can be operated at street car rates. Special service offers unlimited field for expansion.

Old Rails Used to Surface Highway Crossings 379
This and other track and overhead methods have recently been developed by the Illinois Traction System.

Combined Snow Scraper and Sweeper 380

Twin Drive Bus Makes Its Appearance 381
New vehicle developed by F. R. Fageol has two separate plants located beneath body. Absence of hood in front leads to radical changes in design from ordinary type.

The Readers' Forum 383

Maintenance Notes 384

Association News and Discussions 387

Co-ordination and Safety Discussed by Kentuckians 387

Transportation a Community Problem 387
BY W. H. SAWYER.

Air Brake Requires Proper Installation and Maintenance 389
BY W. M. C. HORNER.

News of the Industry 391

Foreign Notes 394

Recent Bus Developments 395

Financial and Corporate 397

Personal Mention 400

Manufactures and the Markets 402

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Electrical World
Industrial Engineer
Electrical Merchandising
Radio Retailing
Successful Construction Methods
Electrical West
(Published in San Francisco)
American Machinist—European Edition
(Published in London)

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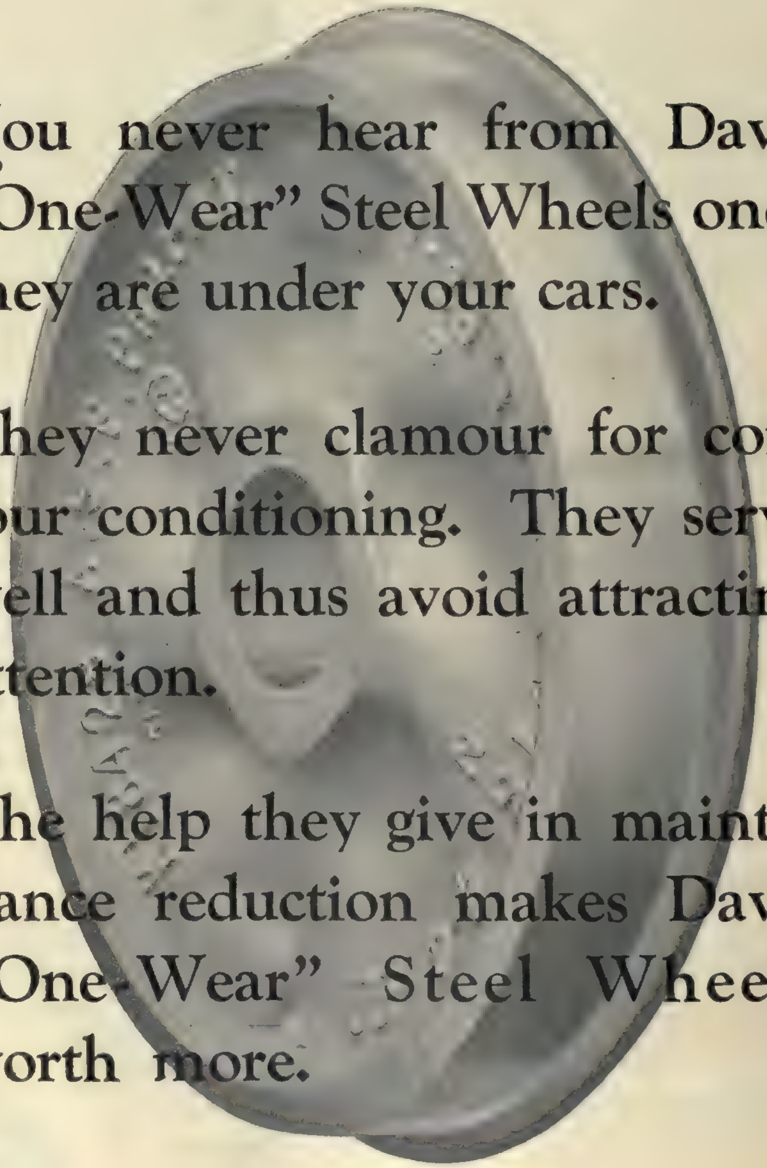


"One-Wear"—No Repair

You never hear from Davis "One-Wear" Steel Wheels once they are under your cars.

They never clamour for contour conditioning. They serve well and thus avoid attracting attention.

The help they give in maintenance reduction makes Davis "One-Wear" Steel Wheels worth more.

AMERICAN STEEL FOUNDRIES
NEW YORK CHICAGO ST. LOUIS

O-B 1,000 ampere Line Section Switch, single pole, without separable terminals. Cat. No. 11365

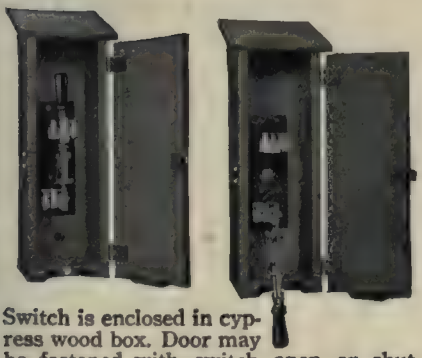
Quicker than the Eye —quicker than the Arc

THE entire break is made with the big, current-carrying blade itself—there is no secondary blade nor auxiliary device to work loose. No springs nor small parts are called upon to carry the current, even momentarily.

Pulling the handle brings into play a powerful phosphor bronze spring, which snaps the blade out of the contacts. A wide gap is formed so quickly that the arc cannot carry over.

Latest improvements include heavier slate bases, more contact surfaces, ground-in contacts all around, and a big soft rubber grip on the handle. The handle itself is of Flecto Iron, the O-B brittle-free hot-dipped galvanized malleable.

Furnished with, or without switch boxes, in capacities from 100 to 1000 amperes—750 volt rating. Shipped from stock.



Switch is enclosed in cypress wood box. Door may be fastened with switch open or shut. When switch is open insulated handle only, projects through slot in bottom of box. When switch is shut this slot is covered by a spring-closed slide. All hardware fittings are of bronze.

Ohio Brass Company, Mansfield, Ohio
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada
1808

Ohio Brass Co.

PORCELAIN INSULATORS
LINE MATERIALS
RAIL BONDS
CAR EQUIPMENT
MINING MATERIALS
VALVES

Westinghouse Air Brakes

—develop a retarding force sufficiently powerful for stopping even the heaviest bus quickly to increase safety and permit faster schedules.

—provide automatic equalization to minimize skidding and lengthen life of brake linings.

—relieve the driver of braking fatigue to increase safety and utility.

OLD fashioned conveyances were safe, but slow.

Today we demand that every means of transportation at our disposal be rapid, as well as safe.

The automotive industry is producing motor coaches that are commodious, comfortable, "get there quickly," and are SAFE, because—

Westinghouse Air Brakes are now recognized by leading bus builders as the most satisfactory means of safeguarding highway transportation.

"Pioneers and specialists in air brake development and manufacture since 1869."

WESTINGHOUSE TRACTION BRAKE CO.
Automotive Division, Wilmerding, Pa.

WESTINGHOUSE
AUTOMOTIVE AIR BRAKES

Any type of concrete track can be

Saved . . .
Salvaged . . . Used over

The accepted first step toward lowering track costs

In the first place, the Twin Tie design reduces the construction material 40%. And realizing that concrete and excavation usually make up 82% of the total track cost—you can readily appreciate just how much this 40% savings would mean to you.

Secondly, the experience of the many users of Twin Ties show that track may be laid on Twin Ties with a 50% savings in labor costs.

Actual data on installations and other interesting details are in a booklet that is yours for the asking—Write to The International Steel Tie Co., Cleveland, Ohio.

20% more bearing surface

steel **Twin Tie** *track*

chosen by
The THIRD AVENUE Railway

Beyond the bustle of New York City the Third Avenue Railway stretches its arteries of service out into the highly restricted residential areas of Westchester County

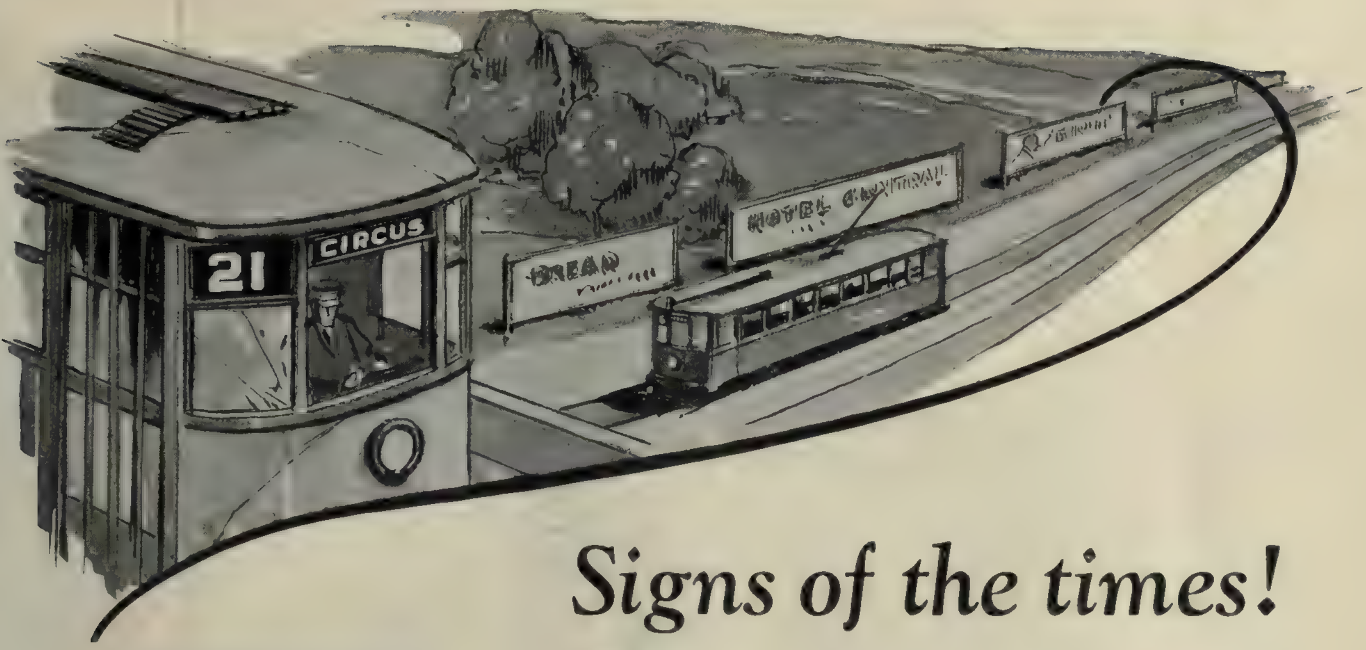
In full appreciation of the class of service their bus operations are called upon to render, the Third Avenue Railway gave careful thought to their choice of bus bodies.

Not only for the value of Fitzjohn expressed as an investment in durability, comfort and long service life, but as a revenue-building, passenger-attracting asset, the Third Avenue railway chose wisely when they chose Fitzjohn bus bodies to serve a discriminating riding public.

You, too, can select a Fitzjohn for your bus requirements. They are built for any chassis, for city service or de luxe transportation.

FitzJohn

FITZJOHN Manufacturing Company
Exclusive Bus Body Builders
Muskegon Michigan



Signs of the times!

All along the roadway are long lines of billboards. Manufacturers spend millions of dollars to advertise their products by this means.

Advertise your service by this same means in an inexpensive way. Use clear, clean readable signs to mark the destinations and routes of cars and buses.

Hunter-Keystone Signs for cars and Hunter Signs for buses have bold white letters on black roller curtains that "Tell the public where you're going" by day and by night.

Ask for a copy of Catalog No. 7, illustrating and describing the complete line of Keystone Car Equipment—Catalog No. 9 for Bus Equipment.

ELECTRIC SERVICE SUPPLIES CO.

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO
Illinois Merchants' Bank Bldg.

PITTSBURGH
1123 Bessemer Bldg.

BOSTON
88 Broad St.

SCRANTON
316 N. Washington Ave.

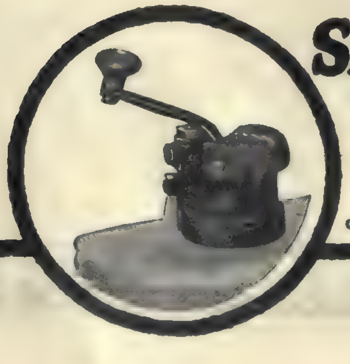
DETROIT
General Motors Building

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver

HUNTER-KEYSTONE SIGNS

Many types—but all Safety Cars

Modern types of cars are as varied as the communities they serve. Single truck, double-truck—single end, double end—all have their place in handling the peculiar problems within their zones of operation. High cars, low cars—long cars, short cars —but all Safety Cars where the best interests of a community and a will to serve vividly and economically are given thought.



SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.
Postal and Telegraphic Address:
WILMERDING, PA.
CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

(3106)

It is a Safety Car if equipped with our standard Safety Car Control Devices

Such Quiet Gears

Transmission gear silence is imperative for a bus. Heavy loads on steep grades and frequent stops draw heavily on 2nd and 3rd speeds.

Mack Transmission gears are quiet. Pleasing quiet draws patronage.

Private automobiles use their transmission gears but little. With trucks, noise doesn't bother the freight.

With a bus, it's different.

Mack secures quiet transmission gears by correctly guiding them on their shafts by generator ground surfaces; by making the shafts stiff and supporting them rigidly by large and thoroughly lubricated bearings; by designing them with wide faces and low tooth speeds; by insisting that the gears are metallurgically and mechanically right.

The price of correctly-meshed, true-running gears with truly-formed, smooth-surfaced teeth is pains-taking care in the manufacture of every part; costly processes not usually employed; special materials formed in special ways and heat-treated with scientific precision.

Gear teeth finished by generator grinding to mirror smoothness and perfection of form are typical of the Mack. They roll quietly. They are frictionless. They continue to hold these advantages indefinitely in the severest service.

In Toledo, Ohio The Community Traction Company—
A Doherty Property—Use Macks in City Service

Not soft cushions alone—

Revenue is influenced by comfort. Long springs, properly balanced, their ends embedded in rubber; seats properly designed with double cushions—spring and air; ample leg room—all these are Mack's contributions in helping to "sell the service". But Mack goes further. For comfort, the ear must not be offended. So, in addition, after designing a quiet, balanced, vibrationless engine, Mack took the noise out of the transmission case.

The Community Traction Company will tell you that the luxury of their Macks have developed their riding habit and that quiet transmission gears have been a factor in creating the impression of luxurious, comfortable riding.

Mack Trucks, Inc.
International Motor Company
25 Broadway, New York City

NP

"GETTING OUT"

Exit at the Rear

Car ready to start when from the rear comes a cry of—

"Getting out"

One lone passenger struggles through the crowded aisles to the front exit door.

Delays — Inconvenience — "Aisle Friction."

The one answer to these difficulties is the *Circulating Load.*

The National Pneumatic Company has evolved the *Automatic Treadle Exit Door* which makes it possible for you to circulate your load in one man service with as much comfort, speed and safety as on two man cars.

Enter at the Front

National Pneumatic Company

Executive Office, 50 Church Street, New York
General Works, Rahway, New Jersey

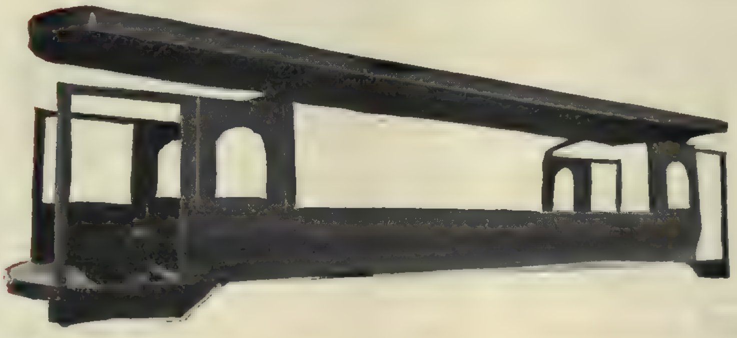
CHICAGO
518 McCormick Building

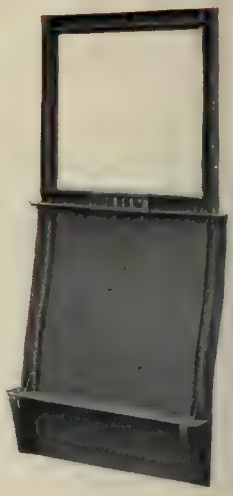
PHILADELPHIA
1010 Colonial Trust Building

MANUFACTURED IN TORONTO, CANADA, BY
Railway & Power Engineering Corp., Ltd.

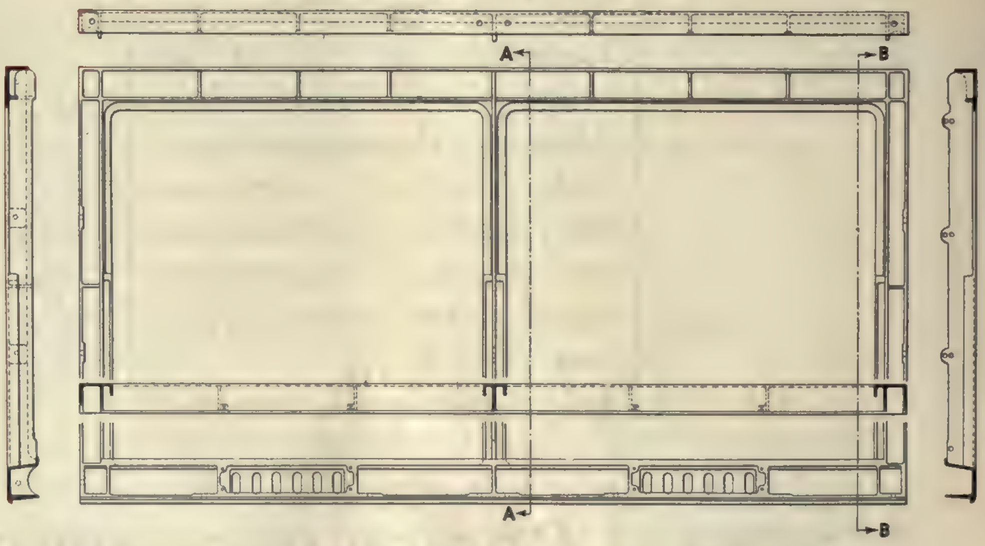
True lightweight—

AN EXTERIOR view of the Cincinnati All Steel Car Frame, above which is suspended the jig-built poplar roof. Note particularly the highly simplified design, and rigid construction with continuous steel channels extending clear across the roof from side sill to side sill at each end.





DETAIL of construction of side sill angle girder plate showing "U" steel stiffeners and the cast aluminum side window frame bolted to the same. This picture shows also the entirely novel "individual" ventilator provided for each passenger, and the method of fastening the skirt to the side sill angle.



THE Cast Aluminum Side frame as used on Cincinnati NEW Cars is made in two-window sections, except where an odd number of windows is necessary. This detail shows clearly the rigid yet simple design of such a section. Greatly simplified construction, interchangeability, great rigidity and easy-to-open windows are outstanding features of this important innovation.

s the direct result of BALANCED DESIGN

A statement by the PIONEER builders and advocates of the lightweight Car

Twelve years ago Cincinnati began advocating the use of lightweight cars on electric railways. Since that time the swing to lighter rolling stock has steadily gained impetus. And Cincinnati, as a pioneer in this movement, has consistently worked to establish a workable and efficient standard of lightweight car construction.

Such a standard has been found in the principle of BALANCED DESIGN. For here lightweight is achieved through accurate coordination of every unit in the completed car, with application of modern lightweight engineering principles in the fabrication of these units. This might be called building *up* to light weight as opposed to the usual "shaving down" process. Hence nothing has been sacrificed and everything gained.

Where conventional design would not give the desired results, radical changes have been made. Some of these unusual features are illustrated and described on the opposite page. They illustrate very clearly how by building Cincinnati NEW Cars as complete BALANCED units it has been possible to achieve light weight in its most modern and efficient form.

We will be glad to discuss this subject in greater detail with interested electric railway executives.

THE CINCINNATI CAR COMPANY
CINCINNATI, OHIO

CINCINNATI
New
CARS

A step ahead of the modern trend

ABB

American BROWN BOVER

Changed from

CHIEF ADVANTAGES

(1) Efficiency high over the whole working range.
(2) Simple operation and minimum attention.
(3) No synchronizing.
(4) Very high momentary overload capacity and insensibility to short circuits.
(5) Negligible maintenance.
(6) Low weight. No special foundations.
(7) Noiseless and vibrationless operation, consequently rectifier substations can be erected in densely populated localities.
(8) New substations need only be of light construction. In many cases old houses can be converted, while the plant can often be erected in places that could not be considered for rotating machinery.

Principal Products

Mercury-Arc Power Rectifiers (steel enclosed)
Electric Locomotives—for any system of current, high or low tensions.
Complete equipment for railway electrification
Rotary Converters
Motor Generators
Complete equipment for outdoor and indoor substations

Diesel-Electric Locomotives

Automatic Regulators

Steam Turbo-Generators for normal or high pressures and superheats

Oil Switches and Circuit Breakers

Transformers

Turbo-Compressors and Blowers

Ships
Diesel Driven
Turbine Driven
Electrical Driven

Dredges and Harbor Equipment

ercury-Arc Power Rectifiers

ne frequency to another with very little effort

You know the difficulty of changing Rotary Converters or Motor Generators from one A. C. frequency to another. It means almost complete replacement.

Unlike any other type of converting equipment, American Brown Boveri Mercury-Arc Power Rectifiers can be transferred from frequency to frequency with very little trouble. This saves you time, effort and expense. It is only one of the many reasons why ABB equipment is worth-while.....why the industry is buying ABB Mercury-Arc Power Rectifiers. Other reasons, especially the higher efficiencies, are indicated on the opposite page.

Bulletin No. 301, describing ABB Mercury-Arc Power Rectifiers is ready. We will be glad to send you a copy.

American Brown Boveri Electric Corporation
165 Broadway, New York, N. Y. Camden, New Jersey
922 Witherspoon Bldg., Philadelphia. 842 Summer St., Boston 230 South Clark St., Chicago

AERA 1927

AMERICAN BROWN BOVERI

Coffee *by Long Distance*

$10,963.20 worth

A COLORADO COFFEE COMPANY devised a new container for its product. On one side appeared the name of the brand, on the other the word "sugar," "corn-meal," "salt" or some other commodity for which the can could later be used. Here was an idea likely to appeal to housewives. What was needed was quick distribution. They got it—by Long Distance. Telephone calls to 19 dealers in 9 states got 18 orders for 27,128 pounds of coffee. Later, the 19th dealer bought as a result of the call.

WHENEVER ACTION is important, we suggest long distance calls. Compare the charges with what it would cost to send representatives in person. Compare the number and size of the orders and compare the time required.

Hundreds of businesses are now using the telephone over states and over trade territories as they formerly used it locally. There are no county or state lines to the telephone, in buying and selling goods; in making appointments; in closing transactions. In saving time and money.

What concern would it pay to call now, in the next state or across the continent? The cost is usually less than you'd think. . . . . *Number, please?*

BELL LONG DISTANCE SERVICE

BELL SYSTEM

More Mileage More Profits

THERE is a black-ink story in Royal Cord Motorcoach Tires. It is written in the cost accounts of ledgers all over the country.

It is a story of interest to all motorcoach operators, for it tells of greater profits through lowered costs of operation—more mileage per tire.

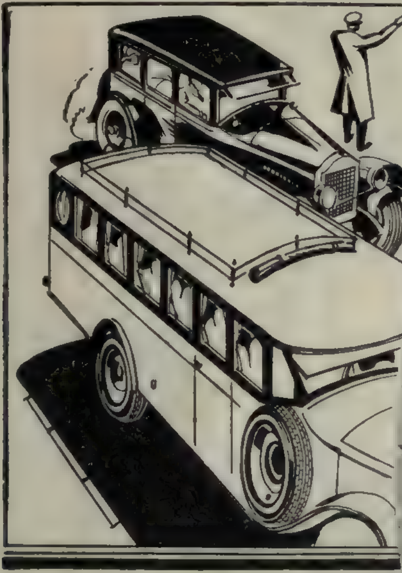
* * *

Back in the days when the motorbus was little more than a converted truck, United States Tire engineers, having already produced the first pneumatic bus tire, set themselves a new objective for a still better tire. They went to work to give the growing industry "the lowest possible cost per tire mile."

Then—because they wanted to know the exact conditions their tire would meet—they studied motorcoach operation, not only in the laboratory but in the field.

From every section of the country, they gathered every bit of data that might aid them. Then, and not till then, they built. And the result was the Royal Cord Motorcoach Tire—a new type of tire, different in every way, fully fitted to meet the new requirements.

Today, the Royal Cord Motorcoach Tire is widely recognized as "The Modern Tire for the Modern Motorcoach."



The motorcoach which keeps its schedules is the motorcoach that gets the traffic. The motorcoach that gets off schedule because of tire trouble, loses it. The United States Royal Cord Motorcoach Tire gives a motorcoach a chance to live up to its time table. It emphasizes comfort and provides an extra measure of safety under all conditions.

UNITED STATES ROYAL CORD Motorcoach

United States Rubber Company
Trade Mark

The Royal Cord Motorcoach embodies the newest principles in tire construction: *Latex-treated Web Cord, Sprayed Rubber, Self-Cooling Bead, Multi-ply Carcass, Scientific Tread Design.*

UNITED STATES
ROYAL CORD Motorcoach

UNITED STATES TIRES ARE GOOD TIRES

When Dependability is All-important
G-E Headlights are Specified

The Chicago, North Shore and Milwaukee Railroad Company won renown by its safe and speedy transportation of the immense crowd which attended the Eucharistic Congress at Mundelein.

In anticipation of this abnormal service demand, the North Shore Line purchased twenty-four new cars. For such an emergency, headlight equipment had to be dependable. There would be no time for substitution or repairs. That is why G-E Headlights were specified.

Year-in and year-out dependability is the basis for such confidence in G-E Headlights.

For
Modern Equipment Standards

330-39

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

Volume 69 New York, Saturday, February 26, 1927 *Number* 9

The Legislative Reformer Is Hard at Work

LEGISLATURES are in session in 41 states. Thousands of bills of all descriptions are pouring into the hoppers. Many of them will never see the light of day. It is just as well. Of all the sins to which humanity—particularly humanity in the United States—is heir, the sin of legislation is one of the worst. It is an ever-recurring but strange sight this, but there seems nothing to do but grin and bear it. That, however, is not so easy to do in some cases. There is no need to go into the details, but the efforts being made in some states to legislate against one-man cars, to return to home rule and to attempt to cure this or that supposed ill by legislation would be funny if they were not quite so serious in their possible consequences.

This does not mean that one should not give serious heed to the recommendations in the Governors' messages abstracted elsewhere in this issue. Some of the things sought to be accomplished are laudable in their purpose. It is to be hoped that the bills intended to put these recommendations into effect may be enacted into law. To assume a negative attitude on the whole matter of legislation will not do just because many of the bills are ill-conceived. It is advisable to work assiduously against bills that are likely to impose hardship on the industry, but while doing so it is also well to try to preserve a philosophical attitude toward the measures of the zealot imbued with the insane idea of reformation at one fell swoop. Nothing helps the reformer more than to underestimate him or to hold him too cheaply. The zealot, enamored of his own estimation of his own importance and charmed by the sound of his own voice, is not dangerous so long as he is content, Narcissus-like, to be satisfied with his own reflection and his own echo, but no one knows how long he will remain thus content. It is when he attempts to translate his zeal into action that he becomes a menace to society. Evidence of the bitter consequences of such endeavor beset the world at every turn. If legislation could make us good, we would be good indeed.

Many Failures in Service Are Due to Carelessness

NOT long ago a certain large department store made a careful investigation to determine the reason for every road breakdown of its motor truck delivery equipment. It was found that about 40 per cent of the breakdowns were due to carelessness, either in operation or maintenance, and that 60 per cent could be properly attributed to causes such as failure of material or general wear and tear. Analyzing further the matter of carelessness, it was found that only 10 per cent of the total breakdowns resulted from faulty maintenance, while 30 per cent were caused by improper operation of the vehicle. These conclusions are particularly significant because the investigation was conducted by a neutral member of the store's executive staff.

To some extent a similar condition exists in connection with electric railway operation of cars and buses. Because of careful inspection methods on most railways incipient failures of material usually are detected before breakdown occurs on the road. For that reason the proportion of breakdowns due to abuse of equipment probably exceeds the 30 per cent found in the cases of the delivery trucks, and the proportion due to material failure is smaller. While the construction of the average railway car is more rugged than that of an automotive delivery vehicle and it will stand more abuse by its operators, the number of road failures resulting from such causes as carelessness and improper operation undoubtedly is large. Careful analysis of this situation would be well worth while on any railway property. Not only would repair bills be reduced but fewer interruptions to service would occur.

Ready-to-Wear vs. Custom Built

MUCH theory has been aired concerning the ultimate rôle which the bus will play in the drama of co-ordinated transportation. There have been some to claim that it might properly be expected to replace the street car, or at least to share honors with it, as an instrument of mass transportation. Enthusiasts all for the bus, the exponents of this theory have shown a singular lack of foresightedness in sensing the real field in which the vehicle might best develop its manifold possibilities. In their eagerness to see its widespread adoption in transportation work they have, in various local instances, come perilously close to convincing the people that the bus is nothing more nor less than a street car on rubber tires.

Much more constructive is the stand taken by an ever-increasing number of transportation executives, that the bus will best serve them as an entering wedge among the class of people who have a decided aversion to rubbing shoulders with the hoi polloi in a crowded car—who prefer the comfort and individuality of their own automobiles, be the attendant evils of traffic congestion and lack of parking facilities what they may. This is no small element in any community of size. It is constituted of people who know what they want and who have the money to pay to secure it. The prosperous business man as a rule does not drive to his office in his own car because he enjoys the task of threading the choked downtown streets and paying an exorbitant parking charge for space in some centrally located garage. But he will do this if he must in order to obtain the privileges which he has been led to believe epitomize social prestige and which certainly guarantee a degree of comfort not obtainable in a mass transportation vehicle.

There is no fundamental reason why buses should not be operated in de luxe suburban service, providing for the better residential districts of a given area a transportation medium quite comparable to the private automobile. Direct express service to the central business and shopping districts; even reserved club car service for the men in a certain residential section who might wish to subscribe to such an institution—these are but suggestions of the possibilities which might be developed by a railway company whose executives have a sense for latent values. Of course the fares charged for these services must of necessity be on a plane to justify the luxurious equipment and attention to individual needs wihch are provided.

Two Pennsylvania systems, the Philadelphia Rapid Transit Company and the Pittsburgh Railways, are among the most recent to embark upon such a program. The former has established a de luxe bus service connecting Doylestown, Willow Grove and the center of Philadelphia. From Willow Grove to Philadelphia no service stops are made. The usual electric car service between the several points on the route has been retained, but a well-planned selling campaign was adopted for the bus service, this being directed at the well-to-do elements of the citizenry of Willow Grove and the other communities along the route. Luxurious 27-passenger gas-electric buses have been provided and the fare charged is considerably higher than the street car fare for the same trip. Similar services offered by the Pittsburgh Railways were explained in detail by T. W. Noonan before the C.E.R.A. at its recent meeting.

These are but examples of the broadening vistas for the bus. It is "custom-built" to fit individual needs of varying groups, while the street car must always be ready on the shelves of the transportation merchant.

Something Different in Fares and Public Relations

UNUSUAL circumstances attended the settlement of the recent fare case in Fort Worth, Tex., an account of which appears elsewhere in this issue. The railway concerned is the Northern Texas Traction Company, 1924 Coffin prize winner. Its approach to the matter differed in detail from the general procedure. In this respect and in respect to the system of rates suggested the case is of interest to the entire industry. The negotiations culminated in the City Council authorizing the rate readjustment by unanimous vote. It was a remarkable demonstration of public good will. The whole proceeding occupied a period of only two months. This in itself is remarkable, but, more remarkable still, not a single letter or protest appeared in any of the newspapers during all this time. At no time in any of the conferences did the company's lawyers participate in the discussion. The company took the position that this was not a legal but a business matter and that it should be handled in a business-like way with technicalities avoided. For taking this attitude the company was complimented by the members of the Council.

So much for the spirit of good will that pervaded the negotiations. Now for the increase and its significance. The new rates contemplate a 10-cent cash fare, three tokens for 25 cents and a pass costing 40 cents a week which entitles the holder to a wholesale rate of 5 cents per ride. This type of pass is somewhat of a departure in charging for railway service. On twelve rides a week the average fare on the ticket is 8⅓ cents, the same as the token rate. All rides that the passholder takes in addition to twelve a week are likely to be in off-peak periods. The company, it is understood, feels that the nickel pass has many advantages over the weekly pass. A supposititious case is that if the company had adopted the weekly pass at $1.25 the passenger would have to use the pass more than fifteen times a week to save any money under the token rate, whereas the feeling of the Fort Worth management is understood to be that the rider is entitled to begin saving as soon as he has exceeded the twelve-ride-per-week mark. Moreover, the buyer of the nickel pass puts up only 40 cents, and if he should be unable to use the ticket for a part of the week, he has less to lose than on the $1.25 or $1.50 weekly pass. The company estimates that 25 to 30 per cent of the passengers will ride on the nickel pass.

As for the actual change in the system, it appears to have been put into effect with unusual celerity. The whole proceeding carries a lesson to the industry, a lesson showing the influence exerted in behalf of a company that has the public good will, and a lesson of the resourcefulness that is constantly seeking to make the electric railways of greater value to the communities they serve while at the same time they strive by wholly legitimate means to turn to their own advantage every resource that may increase earnings.

Two Worth-While Educational Activities

PROVISION for the training of foreman-conference leaders and a study of the methods of training car and trainmen are two aspects of the work of the American Association committee on education on which it has decided to concentrate its attention this year. The decision was reached at the meeting held at Toledo this month in connection with the C.E.R.A. meeting.

Both of these subjects are of vital importance. One relates to the supervisory force, where training in the duties and opportunities of foremanship is both needed and desired; the other is in a field where vast sums of money are spent annually and where a small improvement will net a large return.

The committee on education has through its studies, recommendations and demonstrations awakened a real interest in foreman conferences and other forms of supervisor training. Assent to the need for such training is freely given by all managers who have familiarized themselves with the information now available regarding its possibilities. This assent is based on the conviction, first, that foremen as a class have not realized the full potentiality of their position as intermediary between the men and the management, and, second, that foremen welcome an opportunity to study their jobs as foremen and to appropriate the fruits of modern development in the art of foremanship.

When the problem of the foreman conference is considered, the first question that arises is, Who will lead it? The success of a series of conferences obviously lies largely in the leadership. A high official cannot be leader of a conference of the type that brings out informal and profitable discussion on foremanship. Except in rare cases, men hesitate to disclose their thoughts about their own jobs before an official on whom they wish to make a good impression. The leader must be a man whose position with the company or outside its ranks is such that the standing of the foremen cannot possibly be affected by anything they may say in his presence. And he must have their confidence in his ability to keep to himself what he hears.

Whoever undertakes the leadership of a foreman group will benefit by study of the experience of other leaders. Much material is available through books and pamphlets, particularly those prepared by the Federal Board for Vocational Education. State educational boards, also, stand ready to assist in practical ways. They should be consulted freely. If in addition to these sources of information and leader training the committee on education can directly and indirectly provide further opportunities, countrywide as well as local, for special training of electric railway foreman-conference leaders, the path of the manager who wishes to furnish foreman training on his own property will be made smoother.

The second proposed activity of the committee, training of platform men, is an entirely different matter. There is a real need here also. That present practice is not altogether satisfactory is indicated by the spirit of investigation everywhere apparent. Railways are sending out representatives to study training methods elsewhere so that their own may be improved.

Campaigns such as those for accident reduction, merchandising transportation and energy saving emphasize the qualities needed in the present-day motorman, conductor or operator. The present liberal wage scales warrant high-grade service on the platform. This means training of a new order. The committee on education can help here by formulating, for discussion and adoption by the industry, those fundamental training principles which must be followed in developing the 100 per cent 1927 trainmen.

Courtesy Declares Dividends of Good Will

FROM far off Buenos Aires comes a problem in courtesy some form of which is met with every day by the American motorman and conductor. According to the Buenos Aires *Standard*, a tram guard's problem is difficult in that city. If he invites a passenger to take a seat instead of standing on the platform he is abused for his pains. On the other hand, if he does not invite the passenger to be seated when there is room, he runs the risk of being accused of neglecting his duty. This is the old case of being between the upper and the nether millstones. Undoubtedly there are many people who travel today who have no consideration or discretion, much less courtesy. Dealing with such people presents one of the most important phases of public relations work, in which the platform men should be made to realize that they can be of enormous assistance to the railway companies.

In the last analysis, the motorman or conductor is the company. Upon his ability to analyze human nature rests the success of the company in winning public favor. While it is difficult to keep one's temper when placed between the upper and the nether millstones, it will be a comforting fact if the motorman or conductor is reminded that the only solution of the problem lies in continual courtesy, which, like water washing on a stone, eventually will penetrate surface resistance. The trouble about so-called courtesy is that it is often manufactured politely and is as different from the real article as education is from culture. A real exponent of courtesy is a person upon whom no amount of rudeness can have any effect. Courtesy, the aristocrat of social relations, is found on every step of the social ladder.

We cannot, however, expect the courteous employee to anticipate all of the public relations problems encountered during a ten-hour tour of duty on the platform. Hence it seems the practical thing to assign a specialist to this question with the idea of preparing a skeleton course in platform etiquette. It will be well worth the expense when we bear in mind that a courteous platform man declares daily dividends of good will for his company.

A Reorganization That Saved the Original Investment

FRANK, indeed, in what it told was the paper presented by Robert M. Feustel before the Toledo meeting of the Central Electric Railway Association. The very title of the paper, "Financial Reorganization Saved the Original Investment," was provocative in the disclosures which the title implied. And Mr. Feustel did not disappoint his audience. It is impossible here to recapitulate what Mr. Feustel said. The facts set down by him do not lend themselves to such treatment, but the author was on firm ground when he made the suggestion that some years ago it would have been rank heresy for a utility operator to have admitted that outstanding securities were greater in face value than the actual money invested in physical property. Indeed it would. More's the pity. He was on thoroughly sound ground, too, when he said it had always seemed to him that the utility operators had failed to make the most before utility commissions of the very natural and logical history of the growth of their financial structures. What is most important, he backed up this statement with the reasons for making it.

The problem in the case of Mr. Feustel's property was no different from that presented in many others. Within a period of fifteen years poor guesses as to the choice of territory in some cases and the development of the automobile in all changed what was a perfectly legitimate business enterprise into a task for salvaging. And the salvaging was intelligently done. Money had to be found to better the service and so increase revenues. And that money was found. First mortgage bonds were cut in amount from $9,000,000 to $4,700,000. It wasn't easy to do this. The new securities equaled in face value all of the cash which had been put into the property, including the foregone interest for the three years of default. As things stand now the first mortgage represents only 35 or 40 per cent of the investment, a very different financial set-up from that with which the company started.

Mr. Feustel is over-modest when he says that there is nothing at all remarkable about the plan outlined except that "the new securities did represent all the cash in the properties at face value and were so arranged that future financing would be accomplished, and if earnings would have been low the sheriff was not so near." Particularly was he not condemnatory of the *entrepreneur*. It seemed to him that the original financial structure was a perfectly logical outcome of the highly competitive condition under which the early electric railways were built and that the promoters were well entitled to any profits they could make in gathering so much money into the development of the new and still speculative utility field. With that point of view ELECTRIC RAILWAY JOURNAL is in thorough accord. All in all, Mr. Feustel told a story that the industry needs to have on the records, a story that substantiates the position taken by the committee on finance. On this occasion the need is not to scoff at what was originally attempted, but to proclaim what was eventually accomplished.

Three Classes of Service,

Says T. E. Mitten

Must Be Recognized by Local Transportation Men

Some of us are trying to sell cotton goods in a silk age. The quality of local transportation service has not kept pace with the changing demand of the times. A constantly increasing standard of service at a fair price should be the objective of the industry

AN INTERVIEW BY
Charles Gordon

T. E. Mitten

THERE has been considerable interest—and some skepticism—throughout the transportation world in the steps taken during recent years under the direction of T. E. Mitten to develop all branches of local transportation in and around Philadelphia. Co-ordination to his organization has meant not only cars and buses, but taxicabs as well.

Because of the bold steps which have been taken in putting together various transportation agencies in Philadelphia, I sought an interview with Mr. Mitten to get his ideas regarding the future of the industry. And it didn't take very many minutes to find that taxicabs and buses notwithstanding, Mr. Mitten continues to look on the electric railway car as the backbone of a co-ordinated system of city transport. But more on that subject later.

Mr. Mitten received me in his office in the new Mitten bank—another example of the man's daring ideas. This latest enterprise, like most of his other ventures during recent years, is an outgrowth of his hobby—mutual ownership by employees and management. Whether or not his ideas are generally applicable only experience will tell. But that they are audacious and interesting is apparent beyond question. He did not talk much about the bank and I did not press him on this feature of his plans, as my purpose was to get his views on more direct transportation subjects. However, the bank is a sidelight on the man, and illustrates how far out of the beaten track he has the courage to go in the development of his ideas. Employee-management co-operation had much to do with its inception. One of its features is understood to be a trust department operated at cost, to administer the estates of stockholders and depositors—and of course the employees of the transportation company may be expected to represent a major element in both groups. The average estate of P.R.T. employees amounts to about $3,000. This is a tidy sum. Though Mr. Mitten did not say so himself, I am told that one of the motives that led to the bank was the effort to help in conserving these estates and to protect both employees and their families from the ravages of the shyster lawyer and the fake stock salesman.

I let my imagination run a little as a former street car conductor resplendent in gray uniform and shining hardware ushered me into the bank elevator. When the company needed capital recently it sold preferred stock from car platforms—$10,000,000 worth of it in ten days! Deferred payments are made to the conductors by a transaction little more complicated than the issuance of a transfer. Bankers long ago discovered that people save more if you put a branch bank near at hand. From the making of stock installment payments to the conductor to making savings deposits on car platforms doesn't seem like a long step. No wonder that Philadelphia bankers are watching Mitten with great interest.

Although the bank is beside the real subject, it forms a background for the study of the characteristics of the man interviewed. He is generally considered a radical in the electric railway industry—and he probably is. But since the industry as a whole suffers from over-conservatism, his views on the industry's future and the objectives he has in mind as the goal of his daring moves during the past few years rank him as a distinct optimist on electric railways. Not only is that true, but he is also an optimist on the future of the street car as an agency of public transportation, once it has been developed and applied in combination with other forms of transportation, in a way to take advantage of its inherent service characteristics. Mr. Mitten made all this evident quickly at the beginning of our talk.

Since his acquisition of the Yellow Cab Company of Philadelphia is one of his most recent steps toward complete co-ordination of all facilities, that was a good place to start the questions, to find out just what had led the P.R.T. to acquire the cab company.

"It is the local transportation company's job," he said,

IN DEMOCRATIC America we don't like to admit class difference in anything—but we have it nevertheless. . . . We have three classes of service at three different rates. Once we recognize that condition fully we'll begin to make real progress in development. The bus is the middle class vehicle. It fits between the street car and the individual automobile or taxi. When combined, these three agencies form a complete local transportation system, but we still have considerable to learn about how to utilize each form of vehicle in such a co-ordinated system, and how to build a proper rate structure for the various classes of service given.

"to furnish every form of service required by the public. As we lose the short-haul rider and the strangers in our city with the development of the automobile, why let them go to some other agency that can make a profit from carrying them? The demand for transportation all over this country has been growing rapidly in quantity but changing at the same time in character. Why should we sit by and lose a large proportion of riders who are willing to pay the price of a taxi ride when we can haul them that way at a profit?"

That sounded like good business sense, and so without trying to get further into the taxi matter, another question was ventured in the direction in which I was more particularly interested. "What about the buses, Mr. Mitten, are they going to replace street cars?"

"Not by any means!" was his emphatic reply. And then he asked me a question. "Why do that? What good would it do?

"Substitution of buses for street cars would make no particular improvement in the situation as regards congestion. That would constitute a change without any fundamental advance in transportation facilities, either as to quantity or character. The electrically propelled vehicle has one inherent advantage that we have not talked much about, but which is distinctly in its favor nevertheless. It can be operated under ground and does not produce a gas problem. The great proportion of the people who ride in public vehicles must be taken off the streets in the congested areas and carried in underground streets—for that is all subways really are. In most cities of major size in this country there is no other alternative."

This seemed perfectly sound reasoning, but I did not feel that it covered the whole situation, and so I ventured another question.

SURFACE CARS UNDERGROUND ONLY IN CONGESTED DISTRICTS

"Does that mean, then, that you accept the idea that transportation of the future will be furnished entirely by subways underground along main traffic routes, with buses on the surface to act as feeders, so that street cars will ultimately be no longer necessary?"

Here again Mr. Mitten refused to accept the opinion expressed by others and showed the independence of his thinking.

"I don't think that follows at all," he said, "except in New York, where there are special conditions not comparable with the situation in any other city in the country; any system of subways in other American cities extending beyond the central congested business district would be needlessly extravagant and inconvenient. There is no particular reason why a passenger should have to transfer from rapid transit lines to feeders and vice versa in order to get from his home to his place of work. If you figure time from his door to his office, under such a system it is questionable whether any actual time would be saved in the average city over a system in which the car took him within convenient distance of his home without a transfer after leaving the business district. Certainly there is serious delay in getting through the congested district in most cities. Therefore the thing that is needed is to put the street cars underground when they strike the congestion. On the surface extensions therefrom, they should be operated over routes that would move the greatest possible number of people to their homes with the minimum of inconvenience."

DIFFERENT KINDS OF SERVICE NEEDED

Here Mr. Mitten launched into a very significant part of his discussion.

"One of our troubles in city transportation today is that we are trying to force everybody to use one class of service, whether they want it or not, and that service, from the standpoint of comfort and convenience, is the lowest in grade that the public will bear. In Europe they are just beginning to conceive the real meaning of co-ordination in the sense of tying together various transportation agencies to give the greatest possible variety of service at maximum efficiency. If we don't look to our laurels we'll soon be looking to their leadership. In democratic America we don't like to admit class difference in anything—but we have it nevertheless. On the railroads we have it and it is also an established fact in local transportation, whether we admit it or not. We have three classes of service at three different rates. Once we recognize that condition fully we'll begin to make real progress in development. The bus is the middle class vehicle. It fits between the street car and the individual automobile or taxi. When combined, these three agencies form a complete local transportation system, but we still have considerable to learn about how to utilize each form of vehicle in such a co-ordinated system, and how to build a proper rate structure for the various classes of service given."

At this point Mr. Mitten threw precedent to the winds.

"What do you consider the proper measure of service for the basic or lowest rate agency?" I asked.

"A seat for every passenger is the only acceptable standard," he said. "One of the fallacies in present-day thinking on transportation is that we have started with the assumption that such a standard is impossible. I don't agree with that at all. By providing prepayment facilities in surface car subways under the greater part of the business district in a city like Philadelphia, practically any car when properly equipped with safety devices can be operated with one man. Since platform labor is at least 50 per cent of present operating costs, it is evident that such a saving would enable a much higher service standard than at present can be attained. The increased speeds that would be possible would enormously increase the present capacity of the downtown tracks.

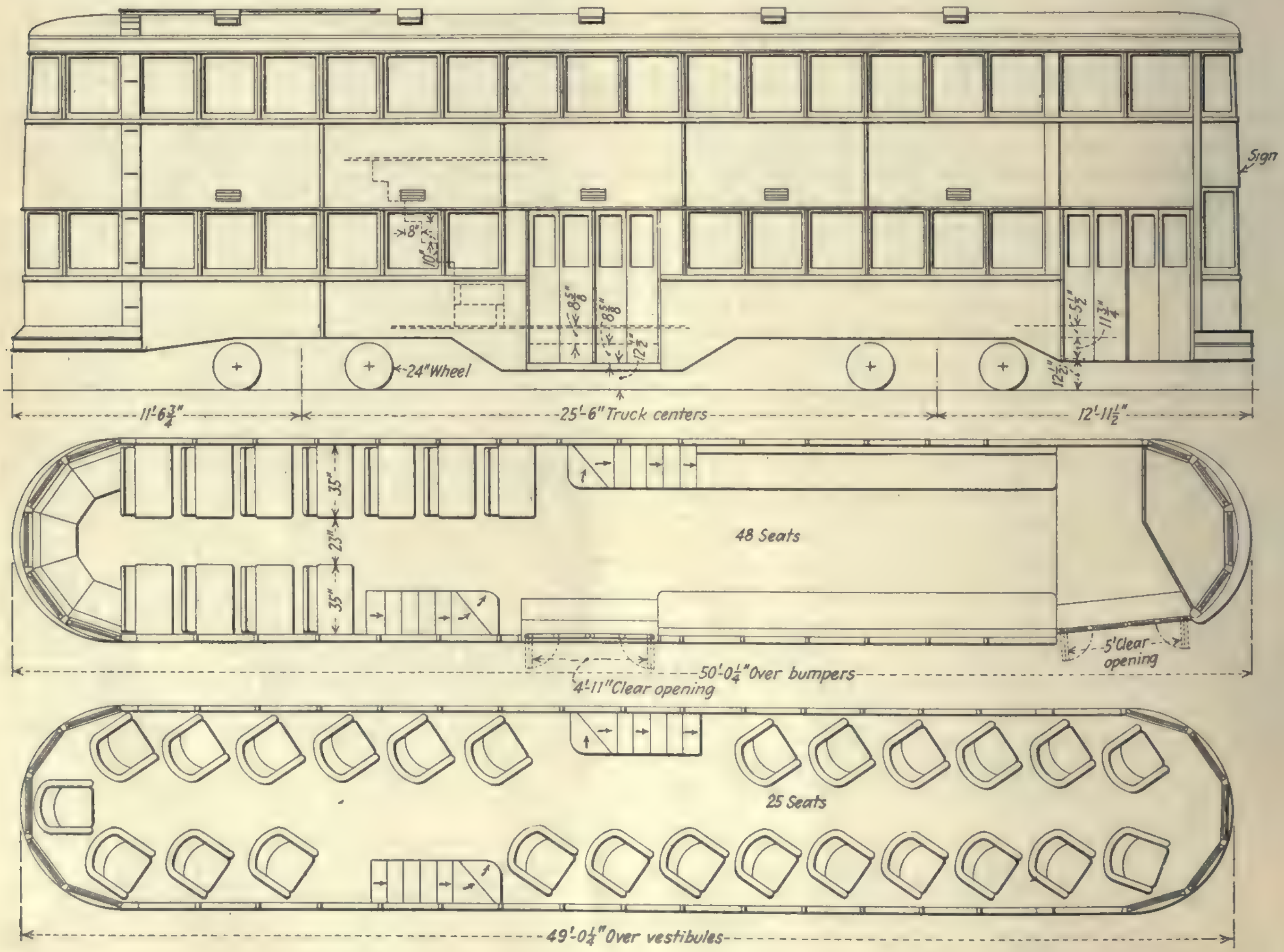
There seems to be no good reason whatever why every passenger cannot be given a seat, and why the rate of fare cannot at the same time be held at a reasonable figure for this popular class of service. Beyond that point the bus plays its part. By putting cars underground and operating buses on the surface, the capacity of the business districts will be increased. At the same time the bus has desirable flexibility for surface operation in the business districts. But its service should be maintained on a distinctly higher level at higher rates. Since it is possible for buses to pass each other going in the same direction on a given street, special express service can be given. This can be developed into a distinctive service at rates of fare which are a proper measure of the value of the service given. And there you have the picture. Beyond that point is the individual vehicle, for those who are willing to pay more for individual service. Each of these agencies, has its own distinct field to serve, and a live transportation company should be in position to furnish any class of service that is wanted. It is a serious mistake to try to bring all transportation to one class, or to permit other agencies to step into a city and take all of those riders who are no longer content to utilize the popular service at minimum cost."

Peter Witt Designs New De Luxe Car

PETER WITT, Cleveland consulting railway expert and car specialist, has just designed a new double-deck de luxe car with which he hopes to increase revenue without a corresponding advance in the cost of operation. To accomplish this Mr. Witt has planned to fit the upper deck with revolving chairs, for which there will be an extra charge. Twenty-five passengers are to be accommodated on the upper level, which is reached by two sets of stairs within the car.

By skillful planning, the main deck is arranged to seat 48 passengers and still leave ample room for standees and for free passage to the upper level. General dimensions of the car are as shown in the accompanying table.

Length over bumpers	50 ft. ¼ in.
Length over vestibules	49 ft. ¼ in.
Height over all	15 ft. 0 in.
Truck centers, two trucks	25 ft. 6 in.
Maximum headroom, upper level	5 ft. 6 in.
Maximum headroom, lower level	6 ft. 6 in.
Side-front entrance, clear opening	5 ft.
Side-center entrance, clear opening	4 ft. 11 in.
Height rail to first step	12½ in.
Height, first step to platform	8⅝ in.
Steps to upper level	8-in. tread, 10-in. risers



Side View and Seating Arrangement of Proposed Double-Deck Car

Fitting the Bus to Its Proper Place

I—In Urban Transportation

By R. N. Graham

Manager of Railways Pennsylvania-Ohio Electric Company

THIS is the first of two articles on the motor bus, which reproduce practically in full an address made by the author before the Metropolitan Section, Society of Automotive Engineers, in New York on Feb. 17. The second article, which will be published next week, deals with interurban operation and certain features of bus design. The present article covers urban operation exclusively. It approaches the controversial bus-car question frankly and is one of the most able discussions of this subject ever published. Mr. Graham considers the bus to be a useful transportation tool and is interested in determining how best to use it. While he explodes some current claims for the bus and strikes directly at the "rubber urge" theory, he foresees for the automotive vehicle a much larger future in urban transportation than that of merely a street car on rubber tires. Every transportation man will be interested in what the author has to say. The JOURNAL will welcome comments by its readers on Mr. Graham's conclusions.

THE company with which I am connected has been operating motor buses for about five years. We have operated a total of 13,609,365 miles. Of this operation, about one-half has been city bus operation and about one-half suburban and interurban operation. The greater part of our city bus operation is in the city of Youngstown, Ohio, which probably has about 160,000 inhabitants. We have some city bus operation in New Castle, Pa.; Sharon, Pa., and Warren, Ohio, which are towns having from 20,000 to 50,000 inhabitants. We have a number of local suburban coach lines connecting Youngstown with surrounding communities and three real interurban operations, a line connecting Cleveland with Youngstown, a distance of about 70 miles; a line connecting Akron and Youngstown, a distance of about 50 miles, and a line connecting Youngstown with Meadville, Pa., a distance of about 70 miles.

The gross revenue of our entire bus and coach operation for the year 1926 was $1,344,072.40. In the city of Youngstown during that year we operated 2,027,964 bus-miles. Gross revenue was $638,145.11 in buses. The gross revenue of both street railway and bus operation was $2,101,877.56. The number of passengers carried in Youngstown by street railway was 23,269,544, and by bus 10,380,431.

The first use of the bus in urban transportation by the Youngstown Municipal Railway was in September, 1922. An accompanying statement shows the gross revenue, passengers carried and bus-miles operated in the city of Youngstown for that year and each year since then.

You will note that we operate in the city of Youngstown about 80 street cars. This is about the same number that we operated in 1921. We now operate in the city 57 motor buses, but in 1921 we had none.

In our conception of our job in furnishing transportation to our communities, we differentiate in no respect between a street car and a motor bus. We view them both as proved agencies of transportation, as the tools of our trade. We do not intend to operate a street car where a bus can be more effectively used, neither do we intend to operate a bus where the use of a street car produces a more satisfactory result in the service to the public and in financial returns to our company.

Prior to 1916, like every other great industry in this country, the electric railway industry, which with steam shuttle service made up the only customary instrument of mass transportation, was extremely liberal in the use of man power from the fact that wages were low. With the increasing demand for man power and consequent increase of wages, the expenses of this industry increased enormously. Like every other industry, the relief was in an increase in the price of the product, which, in this case, was almost exclusively the carriage of local passengers. Increased rates of fare were thus necessary.

AUTOMOBILE COMPLICATED TRANSPORTATION SITUATION

However, unlike other industries, the price of the product could only be increased through a long siege of legal and political endeavors. In the very nature of human things the ultimate result would undoubtedly have been an increased price for the carriage of the public in the cities of the country proportionate to the increase in the expense, if there had not been another development contemporaneous with that which I have just described, greatly affecting mass transportation. This was the increase in the use of the private automobile. The increase in the use of the private automobile took away from the transportation industry a great part of its market at the very time when the cost of giving service was greatly increased.

THERE is hardly a city in the United States of 150,000 population that could not well support this supplementary service and the demand for vehicles for this service would furnish to the motor bus manufacturing companies a more stable market than the attempt to force into mass transportation at standard rates of fare vehicles wholly impractical to operate from a profitable standpoint.

I am reviewing very hastily this development of the decade from 1916 to 1926, because so many people have in their minds a conviction that electric railways in some manner failed to keep progress with the step of the world and because there is a feeling in many quarters that they are in difficulties because they are a passing or obsolescent activity. This confusion of thought is increased by the fact that during the very period that increasing costs and increasing use of the private automobile has embarrassed the street railway companies, the automobile bus has been under process of development, and the tendency has been to reason that the bus is a radically new type of transportation and that in some manner the difficulties of the railway companies are a natural result of the development of a new type of transportation which they either would not or could not use and which is to succeed the electrically propelled vehicle.

Since the problem of mass transportation as distinguished from a service primarily directed to the comfort of the individual is to provide for the carriage of people in groups from point to point in an urban community, it is evident that the generic problems facing such an industry are the same regardless of the vehicle used. There is little difference between the problems encountered in transporting a given group of people with a bus or with a street car. These are simple compared with the great problems facing either class of vehicle as a result of the constantly increasing use of the private automobile, or, on the other hand, the constant increase in operating costs.

To make this point plain, let us assume that in a given city every individual owns a motor car and every individual uses this motor car for any trips that he has to make in the city; there would be no controversy then about the fact that it made no difference whether a public transportation company engaged in business in such a city used buses or street cars; its fate would be certain no matter what vehicle it used.

THERE IS NO "RUBBER URGE"

However, when buses first became more or less generally used in this country, there was persistent talk of the "rubber urge." The idea back of this slogan was that the bus was so much more attractive a vehicle than the street car that people who were no longer customers of the mass transportation industry would again become customers if the bus were used instead of the street car. If this was not the idea, then there would be no advantage to either the transportation company or the public in simply transporting tomorrow on the motor bus the same people that are being transported today on the street car. In other words, the idea back of the "rubber urge" theory was that people who had ceased to ride street cars would refrain from using their private automobiles and avail themselves of public transportation if the bus and not the street car were offered.

It is impossible to define the use of the motor bus in city transportation without giving the most careful consideration to the question of whether this so-called "rubber urge" exists. If there is an impelling factor that will cause people to ride motor buses in preference to their private automobile when they would not avail themselves of other forms of public city transit, then the motor bus occupies an essentially different position than it does if its use is dictated by such factors as flexibility, convenience, economy, speed, etc. To deny this so-called psychic "rubber urge" does not deny the bus a place in city transportation any more than there is denied a place for subway service, elevated service, trolley cars or street cars of varying types. Proper consideration of the question of the existence of this psychological factor would perhaps in the past few years have saved many heavy expenditures. Too much consideration cannot be given to the problem of whether such an urge exists.

In the first place, inferences have been hastily drawn ascribing to this intangible factor facts to which it never contributed. For instance, let us take the ordinary city of this country in which the streets are laid out in checkerboard fashion, as is common in the Middle West towns. On one of these streets there is a street car line, and six blocks from this street and parallel with it there is another street car line. People living on the street half way between the two car lines are compelled to walk three blocks to either line. If a bus is operated on this street, these people will no longer walk three blocks to the car but will patronize the bus line. Here there is no "rubber urge." It is just a matter of greater convenience. The same fact would follow if a car line were built down the street in question.

PEOPLE WILL USE MOST CONVENIENT TRANSPORTATION

Let us take another street car line on which there is a ten-minute headway. If buses are operated on this same street over the same route as that of the street cars, and splitting the headway of the cars, manifestly if similar service is given and the trip takes an equal length of time, a part of the people will ride on the bus. This is not a result of a "rubber urge" but is merely again a matter of convenience.

There have been instances where street car tracks are worn out, the special work gone, the cars old, noisy and decrepit. When a bus entered into competition, practically no customers rode the decrepit utility. They patronized the utility which, under the individual circumstances, furnished them more convenient service. This again is not the influence of the "rubber urge" but is merely again a seeking by the customer of his own personal comfort and convenience. The same result would have followed if a different street railway company had laid new track down the same street, with new, modern, comfortable, easy-riding street railway equipment.

There are still other conditions existing which might lead to a confusion of thought in regard to the "rubber urge." For instance, a given street car route may cross a number of railroad tracks at grade, where there are many train movements or shifting movements, resulting in constant delays to the street railway service. There may be in the neighborhood some street traversing the same locality on which there is a separation of grade so that buses can be operated without the delays and discomforts attached to the steam railroad crossing. In that event there would be considerably more traffic given to such a bus line than to the street car line which had this disadvantage. If a new street railway line were constructed on the street having the grade separation it would possess the same advantage over the original layout.

Again, the street railway line may have been built to accommodate portions of the city as originally laid out, but there has been such a change due to shifting of population centers that there is a more direct route to where the population lives than is offered by the rail line. In such a case, either a bus or street railway line following the more direct route would naturally attract more travel than the old line.

After eliminating all these confusing factors, let us face the question squarely—is there an attraction in the bus itself, disregarding factors which can influence either bus or street railway traffic, that would cause more customers to use a bus service than a street railway service under similar conditions? Leaving out of consideration for the present the question of expense of operation of the two modes of transportation, the query as to whether such an attraction exists is a very important factor in determining whether buses are a substitute for or a supplement to the electric railway car in mass transportation.

TABLE I—GROWTH OF BUS OPERATIONS IN YOUNGSTOWN, OHIO, BY PENNSYLVANIA-OHIO ELECTRIC COMPANY. IN 1926 THE COMPANY OPERATED 80 STEEL CARS AND 57 BUSES

Year	Gross Revenue	Passengers Carried	Bus-Miles
1922	$28,453.56	510,929	112,901
1923	228,425.53	4,032,882	918,644
1924	444,700.25	7,387,091	1,511,091
1925	511,347.59	8,361,236	1,738,930
1926	638,145.11	10,380,431	2,027,964

YOUNGSTOWN AFFORDS COMPARISON OF BUS AND CAR

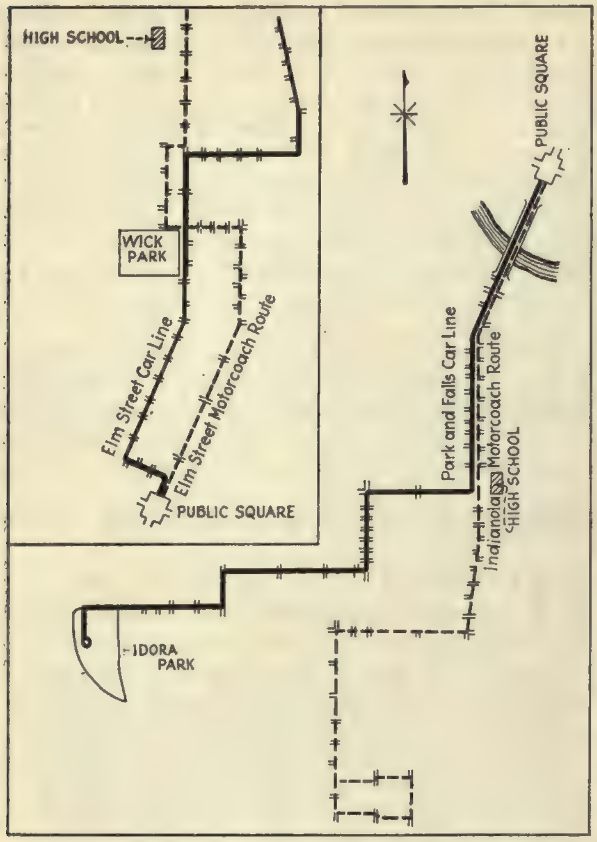
In our operation in Youngstown we have eight bus routes and eleven street railway routes. They are operated with the same rate of fare, the fare being 8 cents cash, tokens seven for 50 cents, and a transfer charge of 1 cent. All bus routes as well as all street railway routes are operated to the center of the city. There are no shuttle lines, either bus or street railway. The bus routes in general are extended into well built-up sections of the city. Duplicate service is not given. In general, the manner of operation for buses and street cars is substantially the same. As a result of five years of operation of bus lines in this manner, I would assert without hesitation that there is little preference shown by the citizens of Youngstown to either bus or street car, but where a choice can be exercised, the choice is generally in favor of the car.

Now I wish to call attention to a specific situation in which the materials for a test of the public's preference are, I think, complete and fair. There are in Youngstown a car line and a bus route which penetrate the same general territory. Both these routes are known as Elm Street. The Elm Street car line is 2.6 miles in length and the Elm Street bus line 2.5 miles in length. For the greater part of their distance they are separated by a distance of three blocks. For less than half a mile they are separated by one block, and for the remainder of the distance by five blocks. This bus route was one of the first of those operated in Youngstown. Service has been continuous on the route for almost five years. An accompanying table shows the service given and patronage on these two lines for the month of October, 1926.

HOWEVER, there is a fourth, and I believe even greater, field than any of those enumerated for the use of this vehicle, and that is as a special, supplementary service at a much higher rate of fare to furnish unusual convenience to customers who do not object to this higher charge. In the city of Pittsburgh there are at present being operated several bus routes from the suburbs to the heart of the city where a 25-cent fare is charged and these routes are being operated with a high degree of success.

The car-miles operated for this month were 22,236. Bus-miles were 21,873. Street cars made 7,846 trips and buses made 8,568. The off-peak headway on both car and bus lines was ten minutes. However, to give this off-peak headway required four street cars and only three buses. Therefore the round trip by cars took 40 minutes and the round trip by buses 30 minutes, so that the service by buses was speedier. This is the fact because a large portion of the car line is single track with passing sidings. On the other hand, only one tripper car was used and three tripper buses were required. The cars operated were the small Birney cars seating 32 people. The buses were modern single-deck equipment seating 25 passengers. The cars had slat seats; buses were equipped with leather upholstered seats. The track of the car line is in as poor condition as any we have in Youngstown, but would be considered fair, average city track.

Thus, with these two lines penetrating practically the same section of the city, operated with absolutely equivalent service at the same rate of fare, the revenue from



Above, Elm Street Car Line and Elm Street Motor Coach Route, as Referred to in Table II. Below, Park and Falls (Idora Park) Car Line and Indianola Motor Coach Route, Referred to in Table III. Car Routes Are Shown in Heavy Lines and Motor Coach Routes in Light Lines

TABLE II—COMPARISON OF OPERATING FIGURES FOR MONTH OF OCTOBER, 1926, ON ELM STREET CAR LINE AND SIMILAR BUS LINE SERVING SAME TERRITORY REFUTES THE EXISTENCE OF A "RUBBER URGE"

	Car	Bus
Length of line	2.65	2.5
Miles operated	22,236.78	21,873.8
Number of trips		
Scheduled	7,746	8,400
Trippers	100	168
Number of cars for base schedule	4	3
Number of cars for trippers	1	3
Maximum number of cars	5	6
Headway—offpeak, minutes	10	10
Headway—peak, minutes	8	6
Round trip—offpeak, minutes	40	30
Round trip—peak, minutes	40	36
Schedule speed	7.99	9.01
Revenue	$7,833.49	$7,585.08
Revenue per mile	0.3522	0.3467
Hours operated	2,781.05	2,427.58
Revenue per hour	2.817	3.132
Total passengers carried	126,355	127,103
Transfer passengers	23,531	23,933
Passengers carried per trip	16.1	14.83
Based on eleven months of 1926:		
Operating cost per mile	0.3102	0.2598
Operating cost per hour	2.8219	2.4291

TABLE III—COMPARISON OF IDORA PARK CAR LINE AND INDIANOLA BUS LINE IN YOUNGSTOWN FOR MONTH OF OCTOBER, 1926. SUPERIORITY OF ELECTRIC CAR FOR LONG-HAUL, LOW-FARE SERVICE, IS SHOWN

	Car	Bus
Length of line	3.76	3.55
To loop	2.75	
Miles operated	52,177.22	30,017
Number of trips—Park	8,664	8,224
Loop	7,414	....
Number of cars for base schedule:		
Weekdays and Saturday	12	7
Sundays	8	4
Number of cars for trippers	..	..
Maximum number of cars	12	7
Headway—offpeak—Park, minutes	10	12
Loop, minutes	5	
Headway—peak—Park, minutes	7	5
Loop, minutes	4	
Round trip—offpeak—Park, minutes	45	36
Loop, minutes	35	
Round trip—peak—Park, minutes	46	38
Loop, minutes	38	
Schedule speed	9.67	10.73
Revenue	$21,944.90	$7,709.90
Revenue per mile	.4205	.2568
Hours operated	5,397.37	2,796.54
Revenue per hour	04.065	02.756
Total passengers carried	359,476	121,937
Transfer passengers carried	66,412	17,521
Passengers carried per trip	22.35	14.82
Based on eleven months of 1926:		
Operating cost per mile	0.3102	0.2598
Operating cost per hour	2.8219	2.4219

the cars for the month of October was $7,833.49 and from buses $7,585.08. The total passengers carried on cars amounted to 126,355, while 127,103 were carried on buses; 23,531 transfer passengers rode the cars and 23,933 rode the buses.

Now, I want to call your particular attention to the average number of passengers carried each trip. On the car this was 16.1, and on the bus 14.8. With a 25-passenger bus, an average load per trip, not round trip but one-way trip, of 14.8 is a very high load factor, being 60 per cent of the total seats offered. The car load factor is high, being 50 per cent of the total seats offered, but from this decreased factor of loading it is evident that more people enjoyed seats on the cars than on the buses. With the exception of the stretch of single track on the car line, there are no physical obstacles to the operation of either car or bus on either of these routes. There is a railroad crossing just outside the public square which holds up both bus and cars impartially. Both cars and buses are comparatively new, the cars being seven years old and the buses anywhere from one to four years old. Both buses and cars are clean and the schedules are well maintained. Both cars and buses are operated with one man each. The men wear practically identical uniforms and badges, and are well trained in courtesy and merchandising practices.

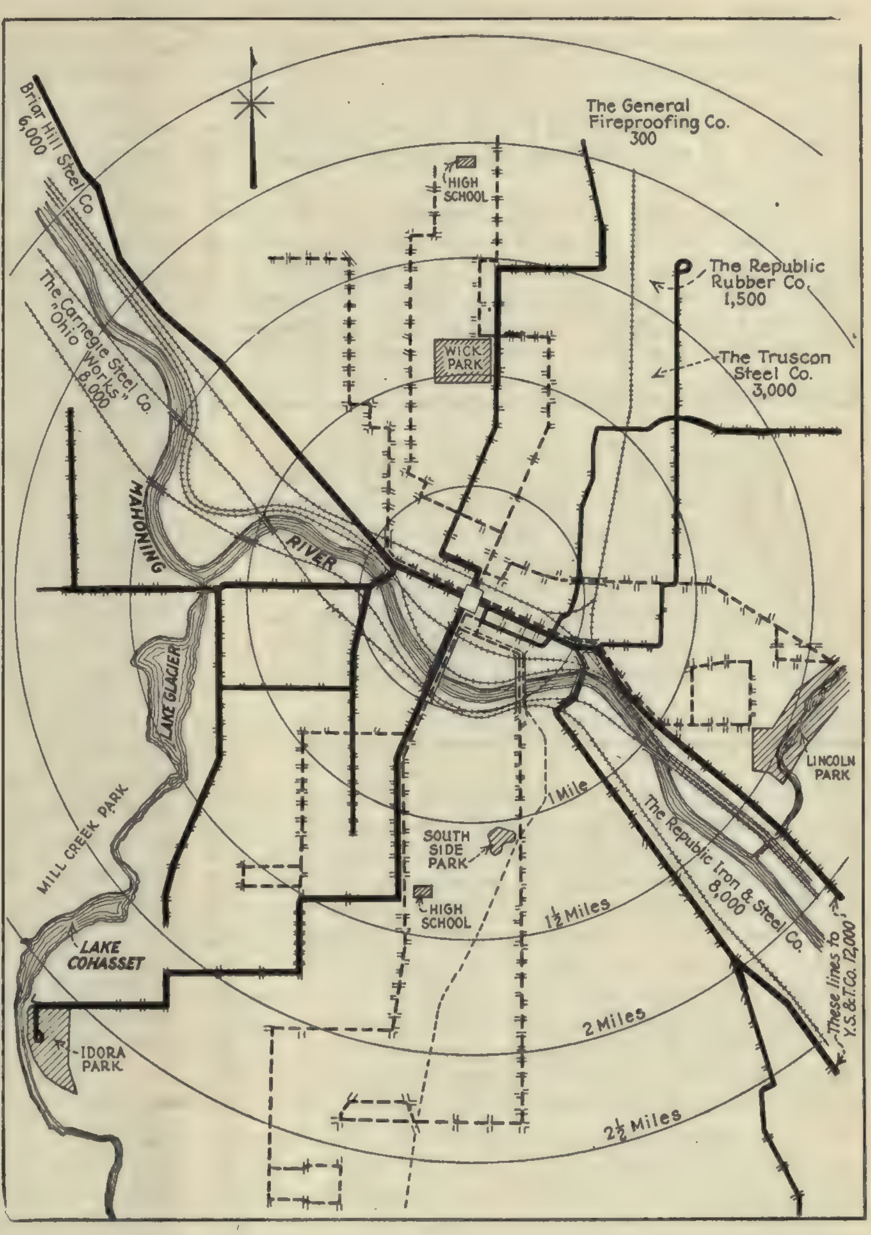
I believe that this exhibit indicates, or should indicate, to any unbiased and impartial observer who is interested only in working out intelligently the tools for mass transportation that there is no inherent attraction in the bus that would cause its choice as a vehicle by a prospective passenger in preference to using his own car that would not be equally applied in every respect to the street car.

BUS HAS BOTH ADVANTAGES AND DISADVANTAGES

I do not expect to carry conviction with a single isolated example. However, the example is a perfectly fair one. The result is confirmatory of our entire experience in this class of operation. I can hear immediately some one saying that the bus loads at the curb and the street car in the center of the street. This is true and in this respect is undoubtedly an advantage to the bus in attracting patronage. It is equally true that the standing passenger is more comfortable on the street car than on the bus, which is to the advantage of the street car. It is true that in congested areas the bus can make better time than the surface street car. It is also true that service with a bus is more flexible. There are many advantages offered by the one vehicle not enjoyed by the other, but in the main these are not fundamental. There is, however, one basic, serious and important distinction between the bus and the street car which at the present time sharply limits the use of the bus as an economic substitute for the street car in mass transportation, and that is its size.

It will be necessary for me here to call your attention to two outstanding features of American mass transportation which differentiate it absolutely from mass transportation in any other country. You are familiar with the fact that in every city of the United States public transportation is conducted on a flat fare, that is, the fare per ride remains the same regardless of the distance carried. This has become so universally the practice and has been the practice for so many years that as a measure of practical expediency it may be said that it is impossible to change or uproot it. You will remember the costly and elaborate experience that was made by the Public Service Company of New Jersey in an attempt to inaugurate a modified form of zone fares in the United States, which attempt was utterly unavailable. There have been numerous attempts, the last one being in the city of Pittsburgh, to create an inner and an outer city zone with varying fares, and these have been generally unsuccessful. Consequently it may be taken as typical of mass transportation in our country that the fare, whatever it shall be, is the same for any ride in the metropolitan zone, whether the ride be for one block or a distance of 9 or 10 miles.

The other distinguishing feature of mass transportation in this country is that with very few exceptions the maximum capacity of the vehicle is used only once on a single trip. With these few exceptions, there is no intermediate riding. In many foreign cities where the country has been for a long time in a high state of development and thickly settled, there are metropolitan areas which are really an aggregation of smaller urban communities. On a single transportation route there are many points on a one-way trip where passengers board and where passengers get off, so that the seating capacity of the vehicle is used over and over on a single trip. In the United States the growth of the cities, in the main, has been like the growth of fresh wood on a tree. The city extends outward in every practical direction from the nucleus first established. As a result of this, whether you go to Cleveland, Chicago, Kansas City, Omaha, Dallas, Houston or Los Angeles, you will find that there is little intermediate traffic. In the morning the workers in store and office ride from their homes to the store and office. In the evening they ride in the reverse direction. During the day there is the single ride from the home to the theater, to the shops and stores and then the ride home. But on any given trip the maximum capacity of the vehicle is in use but once. It is, therefore, a matter of the simplest elementary arithmetic to ascertain the earning capacity of a vehicle for at least 95 per cent of the trips in our cities.


Briar Hill Steel Co 6,000
The Carnegie Steel Co. "Ohio Works" 8,000
The General Fireproofing Co. 300
HIGH SCHOOL
The Republic Rubber Co. 1,500
WICK PARK
The Truscon Steel Co. 3,000
MAHONING
RIVER
LAKE GLACIER
LINCOLN PARK
1 Mile
MILL CREEK PARK
SOUTH SIDE PARK
HIGH SCHOOL
1½ Miles
The Republic Iron & Steel Co. 8,000
LAKE COHASSET
These lines to Y.S.&T.Co. 12,000
2 Miles
IDORA PARK
2½ Miles

Street Car and Motor Coach Lines of the Pennsylvania-Ohio Electric Company in Youngstown, Ohio. The Motor Coach Routes Are Shown in Light Lines and the Car Routes in Heavy Lines

LOAD FACTOR IS LOW

Mass transportation must begin in the early morning, when people commence to move to their work, and ends at night when the last theater, church or public entertainment closes. Consequently the vehicles of any public transportation system must be operated for eighteen hours. During the rush hour in the morning the movement is all from homes to shops, stores and offices. In the evening the movement is in the reverse direction, so that even in peak hours the greatest traffic or movement is only one way. Between the peak hours of the morning and the afternoon and throughout the period when the vehicles are moving at night the traffic is small compared to that offered during the heavy hours. Therefore, in any public transportation utility, we find that there are not as many passengers as the seats offered by all vehicles during the entire period of operation. What we may term the load factor of such a utility is the ratio of passengers carried on all trips to the seats offered on all trips. This load factor for all the cities of the United States will not run above 40 per cent.

It is very plain that if we take the seating capacity of any public transportation vehicle, multiply it by the load factor we may expect and multiply that in turn by the average rate of fare, we will get the earnings of such vehicle on a single trip. If we divide this sum in turn by the number of miles operated on such a trip, we have the earnings per mile. By taking general statistics good for the whole United States, we can reach a general figure of what earnings to expect per mile on any given vehicle.

The average fare per cash passenger in the United States today is 7.6 cents. The average fare per passenger, including transfer and free passengers, and school rates, is approximately 7 cents per passenger. Therefore, if we take a 25-passenger bus with an ordinary load factor of 40 per cent, the average rate of fare of 7 cents, we get 70 cents per average trip. If the length of line is 2 miles, we get 35 cents a mile. If the length of line is 4 miles, we get 17.5 cents per mile. If the vehicle accommodates 50 passengers, then we will get per trip $1.40; if a 2-mile trip, 70 cents per mile, or if a 4-mile trip, 35 cents per mile. It is thus immediately apparent that there is a definite limit to the distance which the small vehicle can be operated. In order to reach this conclusion, we do not have to go very seriously into the question of operating costs. With our five years of operating experience as a basis for buses in city transportation, we are convinced that a fair figure for operating cost of a single-deck, 25-passenger bus is 25 cents without reserve for depreciation and 30 cents including all reserves. Our conclusion on this subject has been backed up by all the operating figures to which we have had access.

THE history of present day transportation in all American cities shows that while the community as a whole may fight to the last extremity for a low rate of fare, there are certain elements in the community who pay little attention to the cost of transportation as long as such transportation is speedy and comfortable.

OPERATING RADIUS LIMITED BY FARE

If it costs at the rate of 30 cents per mile or even 25 cents per mile to operate such a bus, it is apparent that using the general figures throughout the United States for load factor, average rate of fare, the operating radius of the single-deck bus seating 25 people is very little more than 2 miles. However, it must be conceded that the smaller the vehicle the higher will be the load factor. Let us assume, for example, that for a given operation a minimum of six or seven passengers are carried on an average trip. This minimum will contribute more to the load factor of a vehicle seating 25 than it will to a vehicle seating 50 passengers. We may therefore assume that in the case of small vehicles the load factor will reach 50 per cent, or, under extremely favorable conditions, 60 per cent. With a load factor of 60 per cent on a 25-passenger vehicle, there will be fifteen passengers on the average for every trip, one way, during the entire period that the vehicle is operated. Applying the average rate of fare, we would have $1.05 for a trip, producing an operating revenue of 35 cents per mile for a 3-mile trip. This is, manifestly, the absolute limit to which a 25-passenger bus can be operated at a profit on the present average rate of fare.

I now wish to again refer to the comparison between the Elm Street bus and street railway lines. An accompanying table shows the operating figures of these two lines. The revenue per car-mile is 35.22 cents and the revenue per bus-mile is 34.67 cents. The operating cost per car-mile is 31 cents and per bus-mile practically 26 cents. In both cases, to make the results comparable, no depreciation or other reserves, or any return on the investment, is included. The street cars used on this line are the small Birney 32-passenger cars, so that the load factor in both the case of the cars and buses is high, there being sixteen passengers carried per car trip and 14.83 per bus trip. With a seating capacity of 25 passengers on the bus, the load factor is nearly 60 per cent. On a line of this length, it is evident that the bus is the better transportation medium from the standpoint of the public utility giving the service. By the use of a larger street car, the car-mile earnings might, perhaps, be increased, but only by decreasing the headway, and a decrease in headway would probably reduce patronage.

Now let us compare this situation with a case where we again have a bus line and car line going into similar territory, but where the lines are much longer. Such an example is offered by the Idora Park car line and the Indianola bus line in Youngstown. In this case, the car line is double-track and modern cars seating 54 passengers are used. The car line is 3.76 miles long and the bus line 3.55 miles. The buses are the same size as are used on the Elm Street line and the loading is the same, being 14.82 passengers per trip, or again, almost a 60 per cent load factor. Here the revenue per car-mile is 42 cents and the revenue per bus-mile is less than 26 cents. The cost of operation per car-mile is 31 cents and per bus-mile 26 cents. Thus it is evident that here we have an operating profit of 11 cents per mile on the street car while we are operating the bus line at an actual operating deficit, and yet, from the standpoint of traffic, the line is as good as the Elm Street line. In fact, with a 60 per cent load factor, it may be said that the buses on the line are saturated to such an extent that it was necessary materially to increase the number of buses in the following month, which, of course, reduced the load factor and reduced the bus-mile earnings.

TABLE IV—VARIATION IN COST OF MOTOR-BUS OPERATION IN YOUNGSTOWN WITH AGE OF EQUIPMENT. FIGURES ARE IN CENTS PER BUS-MILE. MR. GRAHAM ADVOCATES CHARGING HIGHER DEPRECIATION RATE DURING EARLY LIFE OF BUSES

	Sept.-Dec. 1922	1923	1924	1925	Ten Months 1926
Equipment	2.63	3.21	4.76	5.46	6.15
Conducting transportation	11.83	13.47	15.19	15.34	15.48
Traffic	0.00	0.01	0.00	0.00	0.00
General and miscellaneous	2.03	3.42	4.06	3.54	4.18
Total operating expenses	16.49	20.11	24.01	24.34	25.81
Taxes	0.65	0.48	0.97	0.86	0.66
Depreciation at 25 per cent per year	2.31	2.98	4.22	3.93	2.83
Interest	0.77	1.01	1.00	0.96	0.92
Total fixed charges	3.73	4.47	6.19	5.75	4.41
Cost of service	20.22	24.56	30.20	30.09	30.20

Therefore, reasoning from these two examples, we would say that with a bus seating from 25 to 29 passengers on a line practically 2½ miles long the bus is a better transportation medium than the street car, but on a line 3½ miles long it cannot be operated except at a positive loss. On the two lines compared the only difference is in the length of trip.

These two typical cases prove the formula we have just asserted. If, on the line 2½ miles long, with a very high load factor, we get a revenue of 35 cents per mile, we should naturally expect on a line 3½ miles long with the same rate of fare and with the same load factor to have the bus-mile earnings reduced in the exact proportion as the length of line is increased, and this is just exactly what has happened in these typical cases. Therefore, we have assumed, first, that single-deck buses cannot be operated at a profit even under the most favorable conditions of traffic at a city rate of fare for a distance longer than 3 miles. Second, that the only change in the situation that will permit the operation of a single-deck bus for a distance longer than 3 miles for a profit will be a substantial increase in the seating capacity of the bus. This increase must be substantial because it is entirely practicable to operate street cars seating as many as 60 passengers with a single man.

It may be argued that one remedy would be to increase the average rate of fare. The street railway industry has been carrying on a campaign for ten years to increase the average urban rate of fare and has progressed from 5 cents to an average of 7.6 cents, so that there would be very little chance of increasing the average rate of fare sufficient to overcome the penalty of the small seating capacity of the bus.

The next point that arises is the question of increasing the size of the bus. If this increase is brought about by an upper deck, such increase is of no practical value in the average American city. The double-deck bus would require two men and the only hope of transportation at our ordinary city rate of fare is the elimination of the second man on every transportation vehicle. To use a bus with two men in comparison with a street car operated by one man would cause the operating cost of the bus to be greater than the operating cost of the street car.

It may be argued that double-deck buses could be devised and have been devised to operate with one man. Here we enter on another extremely dangerous ground, that of the avoidance of accident cost. Twenty years ago the wheel height of the standard American street car was 34 in. At present the wheel height of the standard street car is 26 in. It has required the combined resources of the business over a period of twenty years to reduce the floor of our cars 4 in. for the purpose of eliminating the accident hazard attached to the carriage of the public in mass transportation. To arbitrarily add 6 ft. to the height which any of the passengers have to negotiate in order to reach their seats without the attention of a second man to regulate the motion of the vehicle would be utterly impracticable to the ordinary operating company.

It is impossible for me to understand how it can be argued that a 25 or 29-passenger bus can be successfully and economically operated on an average city route of more than 3 miles. There can be no question about the fact that our business, taking the country over, is without intermediate hauls. There can be no question about the load factor that can be expected. There can be no question about our average rate of fare. Therefore, to expect such a vehicle to prove profitable in operation on a long trip is an arithmetical impossibility.

BUS FIELD LIMITED FOR MASS TRANSPORTATION

You may therefore ask, where is the field in city transportation for the 16 or 21-passenger bus? My answer to this is that there is no such field in city mass transportation.

Where, then, in our cities can the 25 or 29-passenger bus be used? First, on routes not to exceed 3 miles where the traffic is dense. Second, on routes longer where through unusual or peculiar conditions there is intermediate traffic. For instance, crosstown lines crossing several street railway or other public transportation routes where passengers get on and off at many different transfer points might readily build up the bus-mile earnings to such a point as to render the use of the bus feasible. Third, and this I regard as the most important present use of the bus in urban transportation, to furnish service in territory unserved by street car lines in a city where the financial condition of the street railway company forbids the installation of track but where the rendering of some form of transportation service is necessary in order to round out the function of the utility as a giver of transportation service in such community.

WE KNOW that the American public is vitally opposed to a sweeping increase of fare for every one. On the other hand, there is no reason why any one should object to a higher fare for specialized service, when such specialized service does not interfere with the regular service given at a regular rate of fare.

On our property all our long bus lines are operated for this reason and for no other reason. They are operated at a loss in order to give the public, as a whole, transportation to all parts of the community.

AN UNLIMITED FIELD FOR SPECIAL SERVICE

However, there is a fourth, and I believe even greater, field than any of those enumerated for the use of this vehicle, and that is as a special, supplementary service at a much higher rate of fare to furnish unusual convenience to customers who do not object to this higher charge. In the city of Pittsburgh there are at present being operated several bus routes from the suburbs to the heart of the city where a 25-cent fare is charged, and these routes are being operated with a high degree of success.

You see, it does not make any difference which factor of our equation we change; we can increase the bus-mile earnings through raising the fare, reducing the length of the trip, increasing the size, or increasing the load factor. If we triple the average rate of fare, we can either triple the haul or we can reduce the size of the bus. It is perfectly practical to operate a 21-passenger bus at a 25-cent rate of fare where it would be impossible to operate a 29 or 25-passenger bus at the standard rate of fare.

We know that the American public is vitally opposed to a sweeping increase of fare for every one. On the other hand, there is no reason why any one should object to a higher fare for specialized service, when such specialized service does not interfere with the regular service given at the regular rate of fare. This specialized service cannot be given by street car, as one condition would be a high average rate of speed, and an express street car service could not be run on the same tracks as the regular street car service. The public would not permit the use of tracks to be put down in the street to serve only a selected portion of the community.

The history of present-day transportation in all American cities shows that while the community as a whole may fight to the last extremity for a low rate of fare, there are certain elements in the community that pay little attention to the cost of transportation as long as such transportation is speedy and comfortable. These are the elements that are at present using their private cars to go back and forth to their jobs, paying not only for the depreciation, upkeep and operation of these cars, but a substantial sum to house them in garages when they have reached their destination.

The modern bus with its high average rate of speed, which would be automatically made still higher by confining the number of passengers carried to the seating capacity of the bus and keeping the bus within reasonable limits of size, would exactly follow the needs of this class of citizenship and by the collection of fares approximating 25 cents per person, would be made a profitable transportation medium. There is hardly a city in the United States of 150,000 population that could not well support this supplementary service, and the demand for vehicles for this service would furnish to the motor bus manufacturing companies a more stable market than the attempt to force into mass transportation at standard rates of fare vehicles wholly impractical to operate from a profitable standpoint.

SEES ENLARGED FIELD FOR BUS

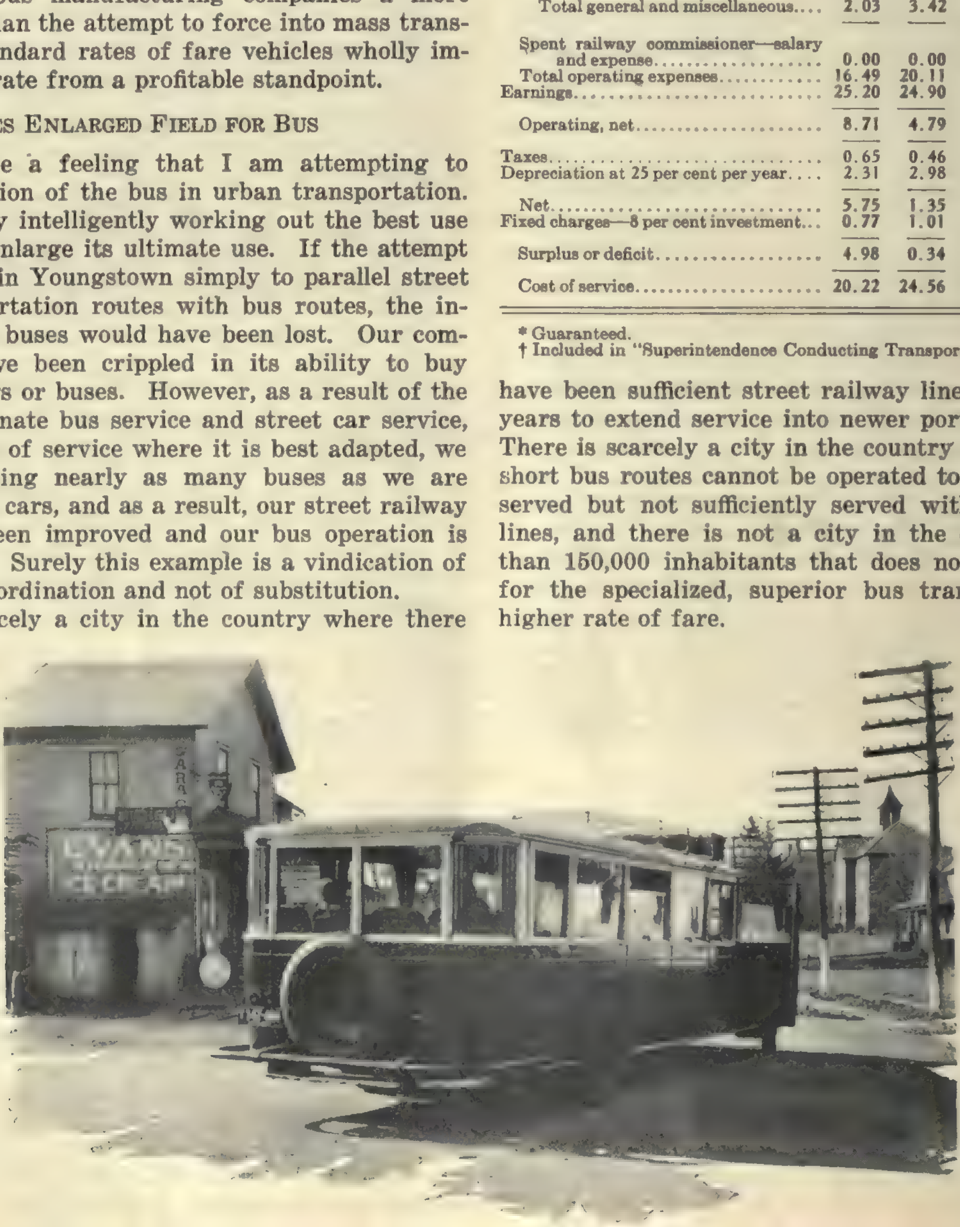
There may be a feeling that I am attempting to argue a restriction of the bus in urban transportation. I believe that by intelligently working out the best use of the bus, we enlarge its ultimate use. If the attempt had been made in Youngstown simply to parallel street railway transportation routes with bus routes, the investment in the buses would have been lost. Our company would have been crippled in its ability to buy either street cars or buses. However, as a result of the effort to co-ordinate bus service and street car service, using each class of service where it is best adapted, we are now operating nearly as many buses as we are operating street cars, and as a result, our street railway situation has been improved and our bus operation is self-sustaining. Surely this example is a vindication of the policy of co-ordination and not of substitution.

There is scarcely a city in the country where there have been sufficient street railway lines built in recent years to extend service into newer portions of the city. There is scarcely a city in the country where additional short bus routes cannot be operated to sections already served but not sufficiently served with street railway lines, and there is not a city in the country of more than 150,000 inhabitants that does not furnish a field for the specialized, superior bus transportation at a higher rate of fare.

TABLE V—DETAILED ANALYSIS OF BUS OPERATING RESULTS IN YOUNGSTOWN, EXPRESSED IN CENTS PER BUS-MILE. EFFECT OF AGE OF EQUIPMENT ON OPERATING COST IS REFLECTED IN THE FIGURES

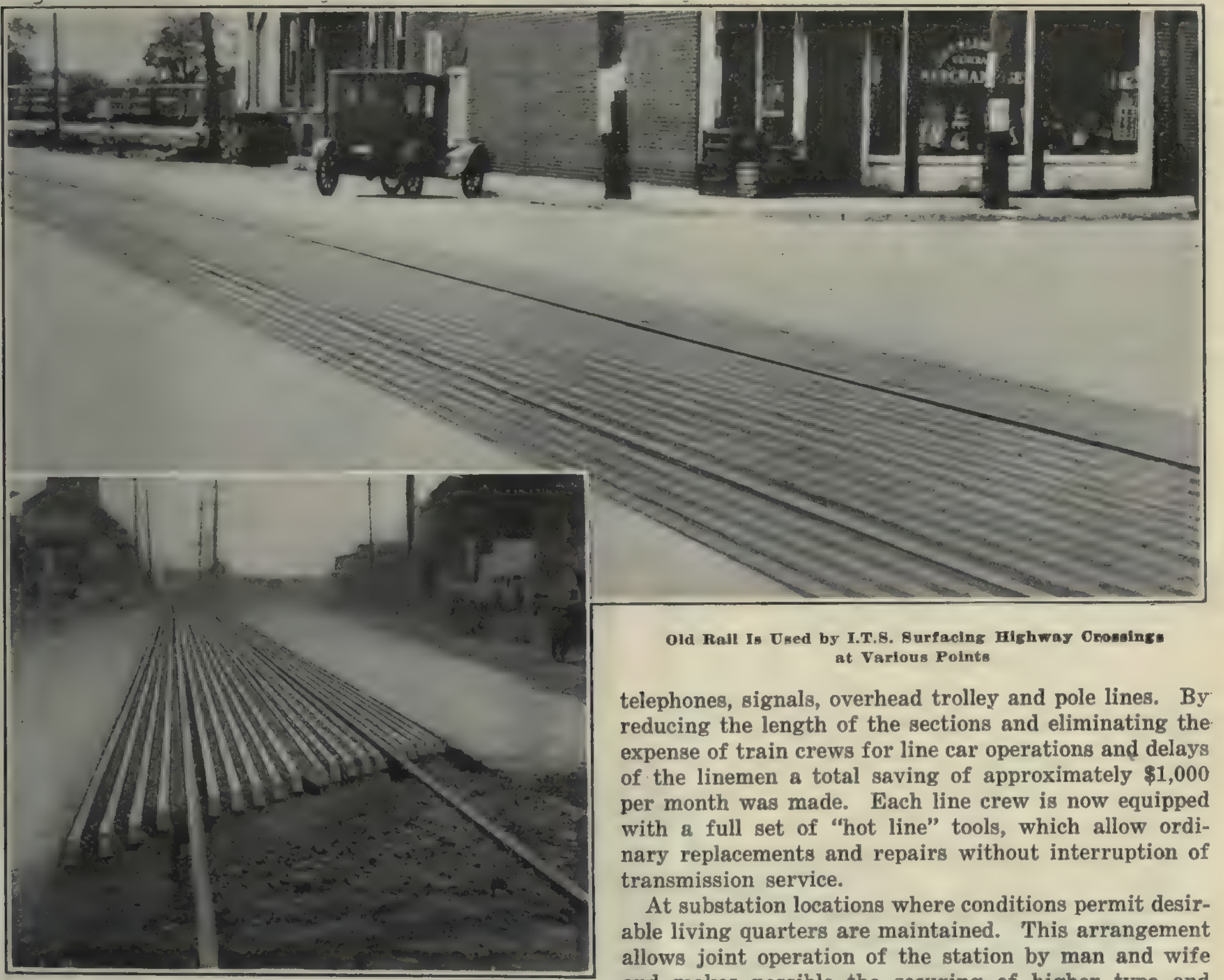
	Sept.-Dec. 1922	1923	1924	1925	Ten Months 1926
Equipment:					
Repairs—buildings	0.36	0.11	0.10	0.05	0.02
Superintendence	0.01	0.20	0.27	0.31	0.29
Repairs—chassis	1.51	1.52	2.32	2.63	3.86
Repairs—bodies	0.09	0.25	0.22	0.34	0.40
Tire repairs and renewals*	0.03	0.83	1.59	1.66	1.56
Accessories	0.31	0.29	0.29	0.39	0.00
Shop expenses	0.37	0.12	0.07	0.08	0.02
Total equipment	2.63	3.21	4.76	5.46	6.15
Conducting transportation:					
Superintendence	0.00	1.03	1.29	1.28	1.16
Chauffeurs' wages	6.05	6.34	6.94	6.73	6.83
Miscellaneous service expense	0.23	0.12	0.31	0.22	0.24
Dispatchers' and street men's wages†:					
Garage employees	1.65	1.57	2.19	2.29	1.80
Garage expenses	0.18	0.17	0.24	0.29	0.96
Gasoline	2.89	3.34	3.39	3.71	3.55
Lubrication	0.54	0.62	0.51	0.37	0.35
Miscellaneous transportation expense	0.28	0.28	0.32	0.45	0.59
Total conducting transportation	11.83	13.47	15.19	15.34	15.48
Traffic—advertising	0.00	0.01	0.00	0.00	0.00
General and miscellaneous:					
Salaries—general officers	0.00	0.29	0.27	0.24	0.19
Salaries—general officers' clerks	0.00	0.15	0.14	0.15	0.14
Office supplies and expenses	0.00	0.10	0.13	0.10	0.05
Miscellaneous general expenses	0.05	0.20	0.26	0.32	0.24
Liability insurance	1.33	1.92	2.23	1.72	2.41
Fire insurance	0.08	0.10	0.28	0.23	
Stationery and printing	0.02	0.01	0.02	0.02	0.03
Stores expense	0.00	0.00	0.00	0.00	0.04
Rent of equipment	0.00	0.18	0.01	0.09	0.00
Rent of garage	0.55	0.47	0.46	0.39	0.79
Total general and miscellaneous	2.03	3.42	3.80	3.26	3.89
Spent railway commissioner—salary and expense	0.00	0.00	0.26	0.28	0.29
Total operating expenses	16.49	20.11	24.01	24.34	25.81
Earnings	25.20	24.90	29.40	29.39	31.01
Operating, net	8.71	4.79	5.39	5.05	5.20
Taxes	0.65	0.46	0.97	0.86	0.66
Depreciation at 25 per cent per year	2.31	2.98	4.22	3.93	2.83
Net	5.75	1.35	0.20	0.26	1.71
Fixed charges—8 per cent investment	0.77	1.01	1.00	0.96	0.92
Surplus or deficit	4.98	0.34	0.80D	0.70D	0.79
Cost of service	20.22	24.56	30.20	30.09	30.22

* Guaranteed.
† Included in "Superintendence Conducting Transportation."



Old Rails Used to Surface Highway Crossings

This and Other Track and Overhead Methods Have Recently Been Developed by the Illinois Traction System



Old Rail Is Used by I.T.S. Surfacing Highway Crossings at Various Points

WITH its more than 500 miles of track, the Illinois Traction System has necessarily had to make a study of the best method of track construction at highway crossings. The fact that its lines are crossed many times in Illinois by improved highways, on which there is a large amount of high-speed and slow-speed automobile traffic, has emphasized the need of both a satisfactory and durable form of laying pavement at these points. The methods followed are described in the brief filed by the company in connection with the Coffin Award contest.

After having tried numerous types and kinds of material for surfacing highway crossings the company decided that old rails would be the most economical foundation for construction of this kind because such paving would require less maintenance and have a longer life than other types. As shown, the old rails are laid parallel to the running rails, with all spaces between rails filled in except for the space required by the wheel flanges. The first crossings built in this way were so satisfactory, both from the standpoint of practicability, economy and satisfaction of the public, that 30 additional crossings of similar construction have been installed.

Some other interesting methods followed by the overhead maintenance department and the maintenance way department follow:

The overhead maintenance department effected an additional economy by increasing the number of maintenance sections from six to nine and equipping the maintenance crew with a gasoline motor car and tower car so they would not have to depend on the regular line cars for their work. The combined crews maintain everything in their territory, such as substations, telephones, signals, overhead trolley and pole lines. By reducing the length of the sections and eliminating the expense of train crews for line car operations and delays of the linemen a total saving of approximately $1,000 per month was made. Each line crew is now equipped with a full set of "hot line" tools, which allow ordinary replacements and repairs without interruption of transmission service.

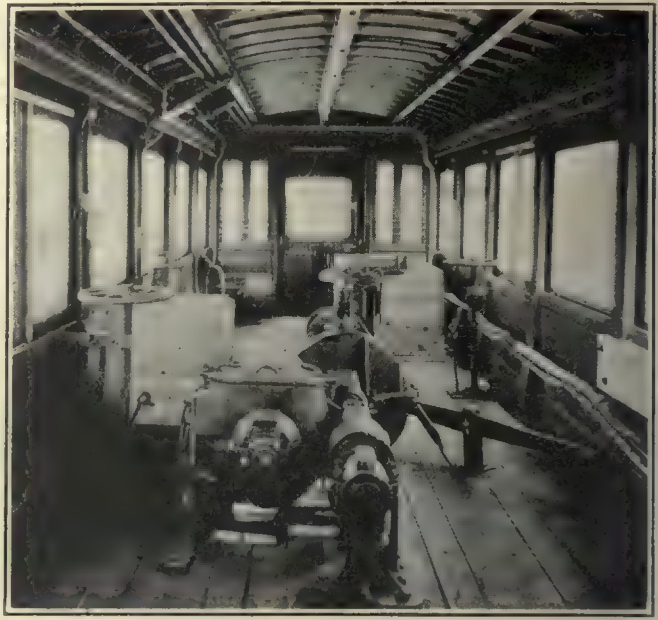
At substation locations where conditions permit desirable living quarters are maintained. This arrangement allows joint operation of the station by man and wife and makes possible the securing of higher type and more reliable employees. The service obtained and the conditions surrounding stations operating in this manner prove the wisdom of this arrangement.

In the maintenance of way department both maintenance and construction methods and practices have been planned and executed with the idea in view of economy and permanence. Since 1909 creosoted ties have been used almost exclusively for main track. During that period 1,081,199 treated ties have been installed. This number corresponds to 90.9 per cent of the total in service. During the same period practically all original ties have been replaced.

The cumulative saving as a result of creosoting is apparent, since had it not been for the use of treated ties it would have been necessary to renew more than 120,000 ties during the past year at a cost of approximately $120,000. The actual cost of ties installed during this period was $45,600 or a saving of $74,400. Treated switch ties also have been used for several years, and during the past year maintenance and installations were less than 10 per cent of the total.

Thermit welding of track joints was tried experimentally two years ago, and this year was adopted as standard for track in paved streets. This applies both to maintenance of old track and the construction of new.

Combined Snow Scraper and Sweeper

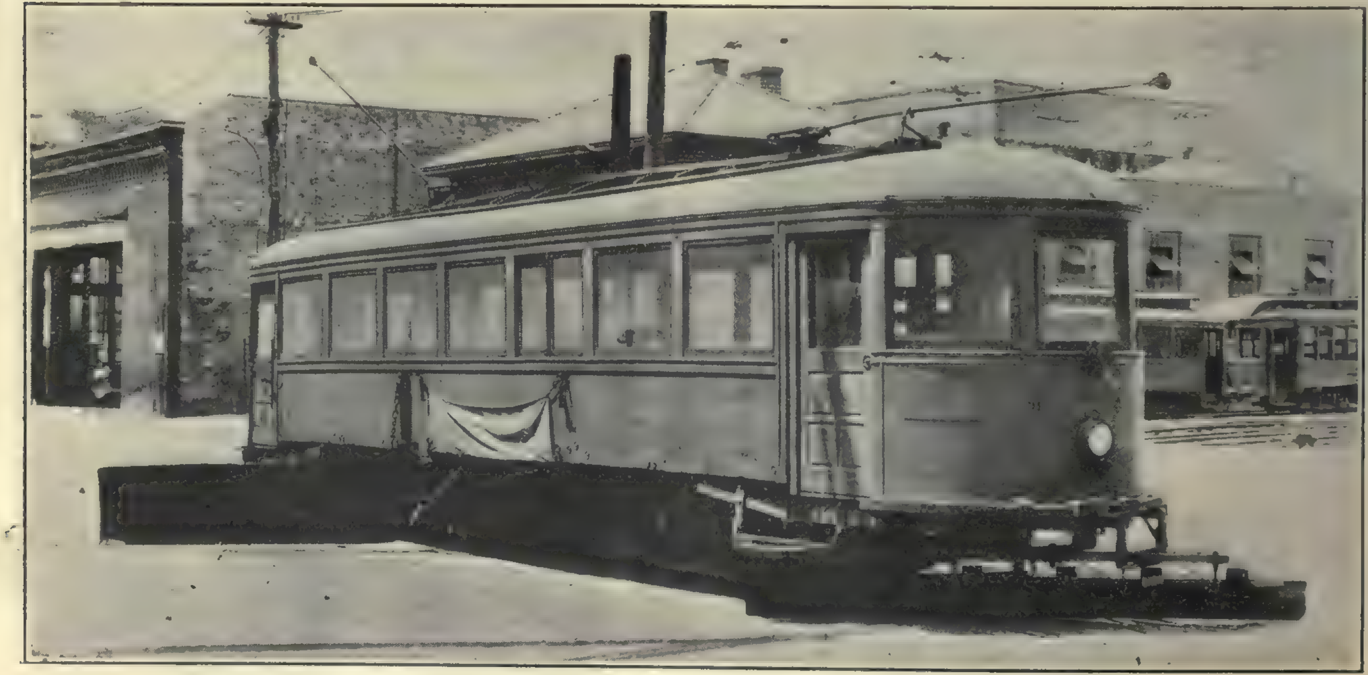


All Electrical Equipment, such as Resistors, Compressors, etc., Is Installed Inside the Car

INCLUDED in the equipment destroyed in the Hall Street carhouse fire of the Grand Rapids Railway, Grand Rapids, Mich., in July, 1924, were two sweepers and a snow plow. The company had two passenger cars which, due to extremely heavy weight, small vestibules and bulky proportions, were objectionable for regular service. It was decided to remodel these into combination snow plows and sweepers to replace similar equipment destroyed. These cars, originally built by the Cincinnati Car Company, were 44 ft. over all and 32 ft. over body. In remodeling these the interior of the car was completely stripped of its furnishings, the monitor deck was removed and the car body was strengthened to withstand the stresses set up by the operation of the scrapers and sweeper broom. An adjustable swinging scraper was purchased, together with a broom and frame. Root spring scrapers were placed at the ends and in addition a flanger was installed on each side of the car. This latter can be operated through chains from the inside of the car. The broom and propelling apparatus were placed midway between the trucks, which is quite a unique feature in sweeper design. A railway motor, old but in good condition, was used for propelling the broom.

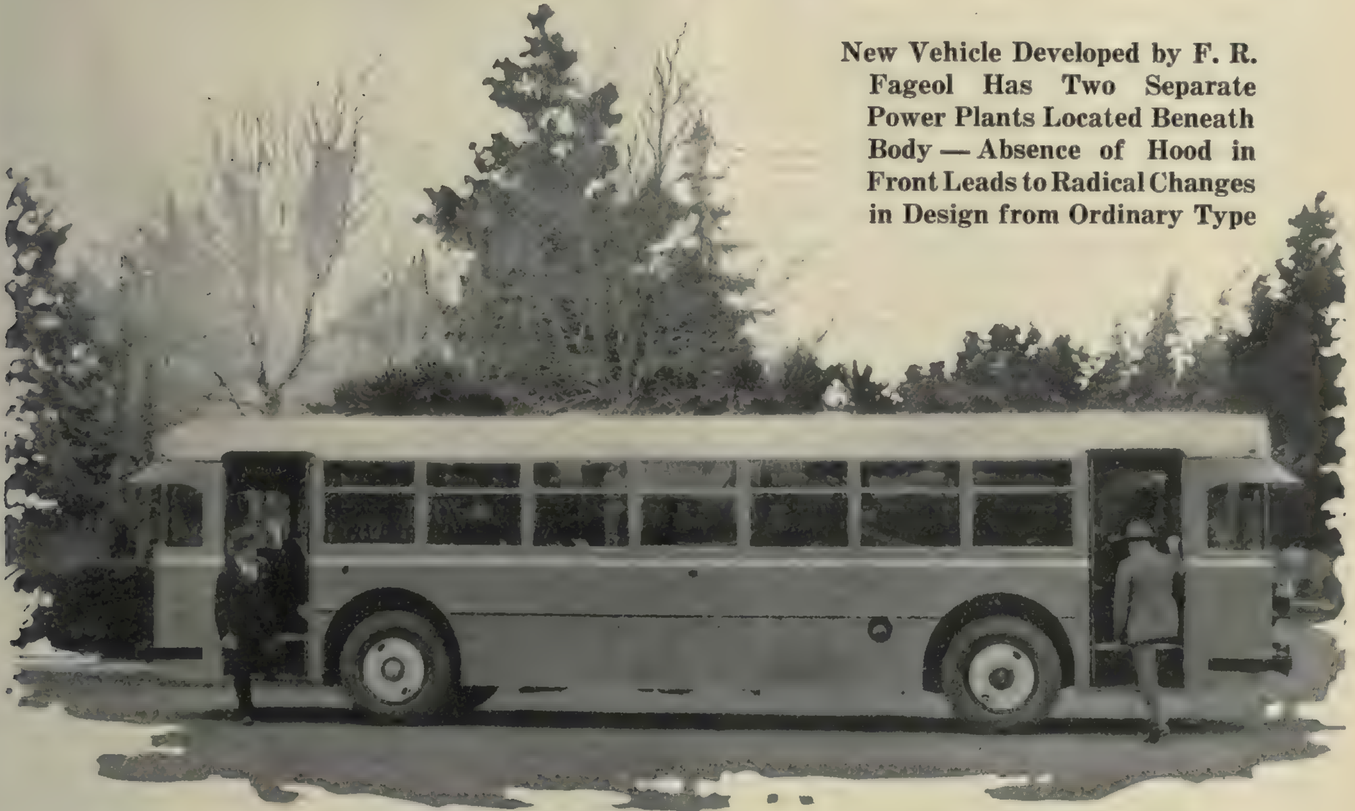
The resistance units, air compressor, air reservoirs, etc., which originally were underneath the car, were removed and installed inside the car. Bins were also constructed for sand and salt, so that when out on the line the crew could salt switches or sand the rails where needed. The car is driven by four GE-70 motors and is arranged for double-end operation. An apron is used at the end of the broom to keep the snow down so that it will fall close enough to be taken up by the flanger, as otherwise it would be thrown far away and against windows and automobiles. When tested the plow performed admirably under all conditions. Snow was thrown outside by the plow and broom and was caught by the scraper and carried to the side of the street, there to be taken care of by the city.

By driving the broom with a separate motor greater efficiency has been obtained as compared with equipment previously used in which the broom was driven by the same motor that propelled the car. The use of this equipment has decreased the number of men in the snow-fighting crew, with resultant lower operating cost. The total amount expended in the reconstruction of this car to provide snow plow and sweeper was $4,337.



Exterior View of Snow Plow with Side Flanger in Position so that a Space 10 Ft. Outside the Car Is Cleared

Twin-Drive Bus Makes Its Appearance



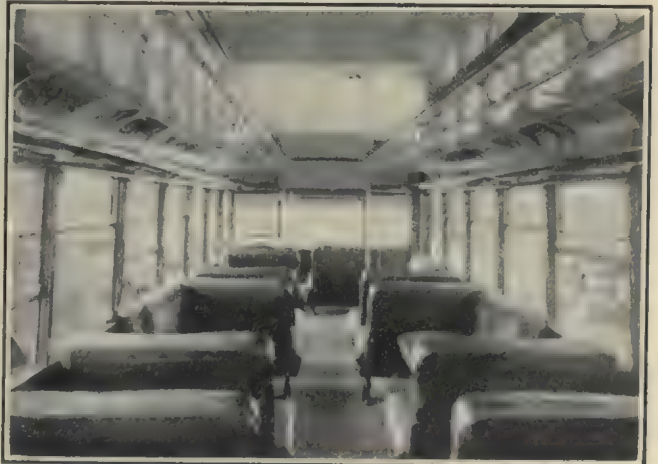
New Vehicle Developed by F. R. Fageol Has Two Separate Power Plants Located Beneath Body — Absence of Hood in Front Leads to Radical Changes in Design from Ordinary Type

DISTINCTLY different from anything that has been placed on the market heretofore is the new Twin Coach designed and built by Frank R. Fageol, Oakland, Cal. The bus, which is illustrated herewith, has two four-cylinder engines, one on each side of the chassis, which drive the two rear wheels through separate worms. According to the builder, the aim is to reduce the passenger-mile cost of transportation.

The new bus, which is built low to the ground, has an over-all height of only 8 ft. 4 in. The over-all length is 31 ft. 6 in. and the width 94 in. The general appearance is somewhat similar to that of the Birney street car, although there has been worked into the design a streamline effect that gives it a long, low, rakish look quite in conformity with present-day automobile tendencies. The wheelbase is 203 in., which gives a turning radius of 34 ft. The gross weight fully equipped is 13,000 lb. It is stated that the vehicle is capable of speeds up to 55 m.p.h.

In its construction the chassis and frame are more closely dependent on each other than in buses of the usual types. The chassis is a frame of light construction, channels running from front bumper to rear bumper being fastened together to form an H-shaped structure. On this is mounted the steel body frame, so built up that the two side structures of the body, together with the chassis channels, form individual trusses tied together by means of the chassis cross members and the sheet steel center panel of the roof. This arrangement allows for the flexing of the chassis along with the body.

On either side, mounted in a recess between the chassis channel and the body side sill, is a four-cylinder engine, with 4-in. bore and 5½-in. stroke. Directly in front of each engine is mounted a radiator with header tank. Each of these power plants is incased in a sheet steel compartment. Power from each engine is carried through an individual clutch, transmission and short propeller shaft to an inverted worm drive mounted adjacent to the brake drum and wheel. There are thus two individual and self-contained driving units. The inverted worm housings are joined by a 3-in. steel tube which acts as a stiffening member. Each worm housing has a spring seat mounted close to the brake drum to minimize the bending action on the tubular tie.



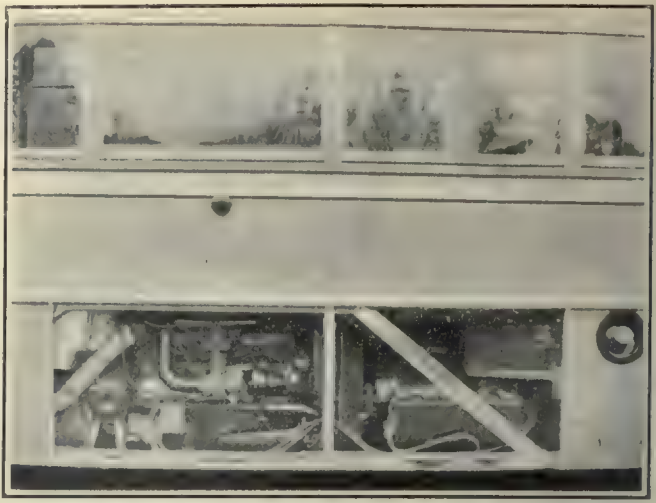
The Interior of the Twin Drive Bus Is Not Unlike That of Other Types, Except Side Seats Are Placed Over the Motors

Because of the side location of the power plants it was found possible to incorporate many innovations in the design. On the forward end of each crankshaft is mounted a 600-watt generator and a 9-cu.ft. capacity air compressor. Together with the 6-volt, 300-amp.-hr. storage battery, these are carried on a shelf in front of the radiator. The 50-gal. gasoline tank is carried between the main frame channel members at the center of the chassis. Feed from the tank to the carburetor is through two Stewart vacuum tanks mounted in the side panels of the body just in front of the radiators. The filling pipe for the gasoline tank is on the left-hand side.

Air is carried through louvers on each side of the body through the radiator, thence it is driven by a fan down past the engine and out under the bus. To make the engine accessible a side plate may be removed as shown in one of the illustrations. The engines are built in pairs, right and left, so that the valve mechanisms and the carburetors are placed on the outside where they are available for easy adjustment and maintenance.

Steering is done in much the same manner as it is on the ordinary type of bus. The steering wheel, however, is mounted ahead of the front wheels, so that the drag link is to the rear rather than to the front. The 203-in. wheelbase and the length of the vehicle place the driver's position approximately 4 ft. ahead of the wheels. This position does not materially affect the "feel" of the driving.

The driver's position is to the left, directly back of the large front window, being similar to that in an electric street car. The control is practically identical with the type used in the ordinary single-motor bus. A single pedal actuates both clutches and a gear-shift lever both transmissions. Two accelerator pedals are mounted side by side. The two form a footrest and are used to synchronize the two engines. By rocking the foot the operator can feed additional fuel to that engine which does not appear to be pulling its share of the load. Two floorboard type starter buttons are located to the left of the driver's seat.



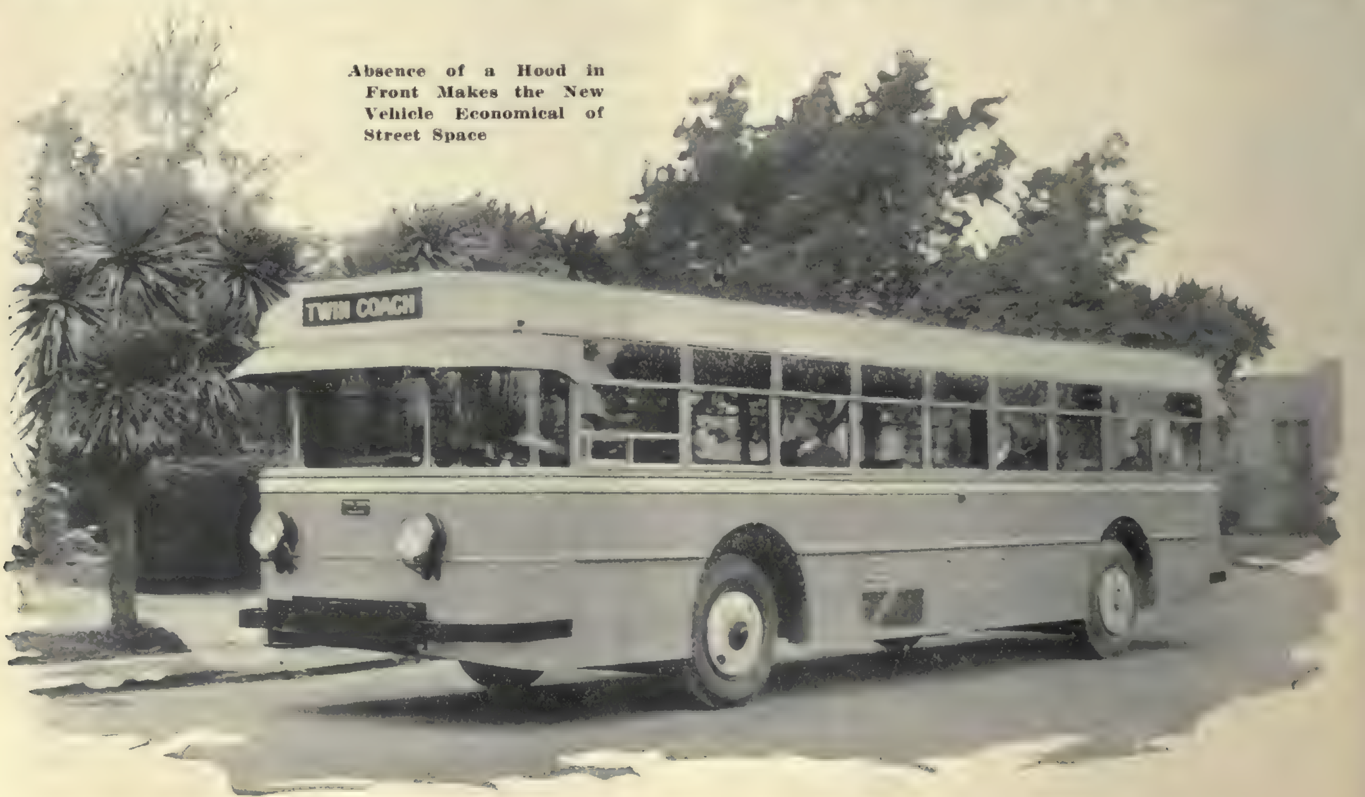
A Removable Panel on Each Side Gives Easy Access to the Driving Mechanism

All four spring mountings are identical, 60-in. x 3½-in. springs being used all around. Tires are single pneumatic on all four wheels. The mounting of the brake mechanism is compact and is built integral with the brake drum mounting.

Interior trim is steel with side paneling of mahogany-finished Haskelite. The floor is exceptionally light in weight, being of ⅜-in. plywood laid in sections so that it can be removed readily for inspection of the driving mechanism. The roof is of the arch type, extended slightly at the front end to form a hood for the illuminated sign. There is a slight break in the middle, increasing the height about 1 in. directly over the aisle.

The lighting is indirect. The ten 21-cp. lamps are placed at the back of a molding located above the windows just below the advertising rack. Reflectors back of the lamps throw the light up against the advertising racks and onto the white enameled ceiling.

Folding doors are located at front and rear. They



Absence of a Hood in Front Makes the New Vehicle Economical of Street Space

are air operated. The floor level is 25 in. above the street. One intermediate step is used, 11 in. above the ground, so that the rise from the step to the floor of the bus is 14 in. Windows are framed with brass sash and are arranged to lift.

The corners of the vehicle are rounded and the glass in the corner windows is curved to conform to the body lines. Both ends of the body, which are identical in shape, are fitted with metal visors. The front has two headlights and there is a bumper at each end. Directly behind each bumper is a recess for a spare tire.

Seats are provided for 43 passengers, and there is room for 30 standees. Above each sheet-steel compartment housing for the engines is a side seat accommodating two passengers. Side seats are also placed over the four wheel housings, which cut up the body. Other seats in the body face forward. A lounge-type seat which accommodates six passengers is carried across the rear of the vehicle.

The Readers' Forum

Gross Net Tax Making Progress

AMERICAN ELECTRIC RAILWAY ASSOCIATION

NEW YORK, Feb. 15, 1927.

To the Editor:

I read with great interest your editorial in the ELECTRIC RAILWAY JOURNAL of Feb. 5, 1927, regarding taxation. In this you brought together the views of John J. Merrill of the New York Tax Commission and Prof. Edwin R. A. Seligman of Columbia University. It does not often happen that the theorist and the practical man are in such complete accord, but in this case you have it, and by bringing these views together you have made out a very strong case for tax revision in this state.

I feel sure that much will be accomplished throughout the various states, if the industry realizes that tax reform is no longer a mere theoretical matter but is a subject that can be approached with real hope of success. Within the last few days gross-net tax bills have been presented by the railroads in two of the New England States, and a third bill of the same nature will probably be presented in Wisconsin, as a result of the report of the interim committee on administration and taxation, in which the committee states:

> That there should be a closer approach to uniformity in the taxation of public utilities is acknowledged by everybody, but the hitch comes over whether they should be taxed at the local rate or at the average state rate. To us it seems that there are valid objections to both of these bases. In fact, much is to be said against taxing utilities on their property at all. What is the true market value of a public utility is very difficult to determine and it is still harder to allocate this total value fairly to each of the several taxing districts in which its property is located. Undoubtedly it is simpler to tax utilities upon their earnings and also more equitable. Clearly, however, it will not do to base the tax solely upon net earnings, because this would often result in no tax at all from large companies. The best suggestion made is that public utilities should be taxed upon what is known as "gross-net earnings" basis, such as was proposed by a special legislative committee in New York some years ago. Under this plan both the gross and the net earnings are taken into consideration in determining the tax, and no company escapes entirely and the companies with the largest net earnings also pay the highest rates. That this method of taxing public utilities deserves serious consideration, we are convinced; but we have not been able to work out the details of this plan or to make the necessary calculations to see where it would lead. We, consequently, refrain from recommending any change in the taxation of public utilities.

An editorial such as yours cannot fail to help our industry.

LESLIE VICKERS,
Economist.

Approves Use of "Popular" Transportation

CITY OF DETROIT
Department of Street Railways

Feb. 18, 1927.

To the Editor:

Allow me to compliment you upon the editorial appearing in the Feb. 12 issue of the ELECTRIC RAILWAY JOURNAL commenting upon the term so commonly used to designate that type of transportation which moves the multitudes.

Your suggestion to substitute the word "popular" for "mass" when referring to this type of transportation is indeed very appropriate because the mention of the word "mass" as applied to transportation generally carries with it a picture of a vast throng or jam of human beings, which certainly does not tend to popularize that form of transportation in the minds of the traveling public.

Another misnomer which is quite commonly used, at least in this part of the country, is the term "platform men" used in reference to motormen and conductors. It is the writer's opinion that "trainmen" is a more fitting term to use in designating that type of employment.

D. A. SMITH,
Acting General Manager.

It Hits the Nail on the Head

EAST ST. LOUIS LIGHT & POWER COMPANY

Feb. 15, 1927.

To the Editor:

I notice the suggestion regarding use of the term "popular transportation" instead of "mass transportation" in the leading editorial of the Feb. 12 issue of ELECTRIC RAILWAY JOURNAL, and I think it hits the nail exactly on the head.

I like, too, your thought for the future on "awakening the public to a demand for something better in transportation at an appropriate price."

JOHN H. MITCHELL,
General Manager.

Old Register Cards Used Again

FOR several years the Union Street Railway, New Bedford, Mass., has used a standard mimeograph machine to print letters, circulars, time-tables, notices, etc. Recently, however, this machine has been used extensively for the printing of forms on the backs of discarded register cards, meter cards, etc. The cards are made of heavy manila cardboard and after serving their purpose as accounting cards were formerly sold for old paper or used as note cards. As the backs were usually clean, they made excellent record cards when run through the mimeograph machine and stenciled into form cards. Among the uses found for these cards were inspector's traffic checking forms, tire change forms, mileage reports and several special checking reports. The cost of making these cards is nominal as the cost of the material is practically nil and they can be printed by the office clerks at times when they are not busily engaged with office work.

Maintenance Notes

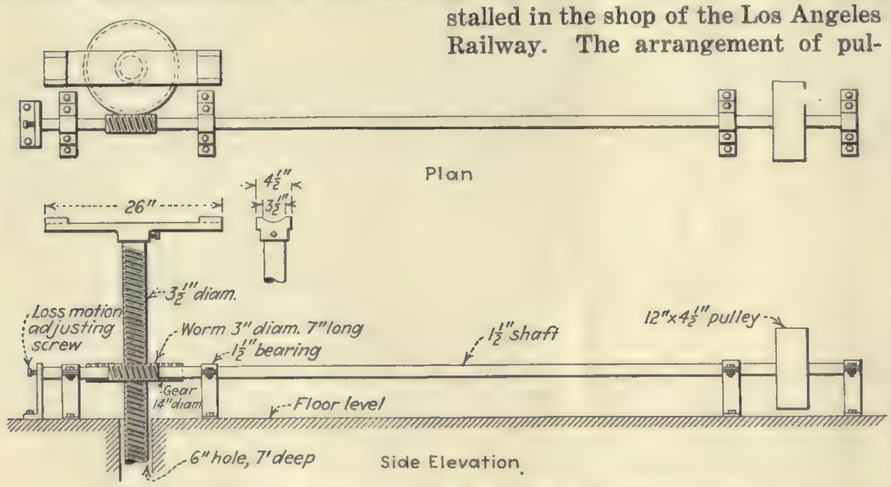
Motor-Operated Wheel Jack

REMOVING a pair of wheels from a truck or installing a pair of wheels in a truck was always considered a slow and tedious process in the shop of the Lynchburg Traction & Light Company, Lynchburg, Va., until Master Mechanic Cochran designed and constructed a motor-operated jack for this work. The principal parts of this equipment are a line shaft, worm, pulley, lifting screw, gear, axle cradle, bearings and adjusting screw.

A 1½-in. diameter steel shaft 10 ft. long is designed with a worm of 3 in. diameter and 7 in. long, located about 12 in. from the end of the shaft.

About 10 in. from the end of the shaft opposite the worm is a 12-in. x 4½-in. iron pulley keyed and fastened rigidly to the shaft. The assembled shaft is mounted on four bearings fastened to the floor by lag screws, and sufficient clearance is allowed between the pulley and worm and the floor. A ¾-in. adjusting screw, mounted on the worm end of the shaft, provides a means for taking up lost motion between the worm and gear teeth. A 14-in. worm gear wheel in mesh with the worm drives a 3½-in. diameter lifting screw passing through its center. A 6-in. hole in the pit floor 7 ft. deep allows free and unobstructed upward and downward movement of the lifting screw. A heavy malleable-iron grooved axle cradle mounted on top of the lifting screw provides a means for balancing of the wheels during the handling process. The jack is belt-driven by a General Electric 2-hp., three-phase, 230-volt, 1,800-r.p.m., 60-cycle motor, equipped with a 4-in. paper pulley. The lineshaft, bearings, worm, and in fact all parts of the jack adjacent to the floor, are boxed in with 1-in. oak boards to prevent injury to the workmen.

This motor-operated wheel jack has resulted in increased production and decreased effort due to the rapidity with which it is possible to change wheels.



Motor-Operated Jack for Installation or Removal of Wheels from Trucks

Brake Gives Uniform Band Wire Tension

Close-Up View of the Brake, Which Is of the Automobile External Contracting Type. It Is Held Closed by Weights on the Lever, but Is Operated as the Tension on the Wire Turns on the Pulley Shown Just Above the Brake

PROPER tension is maintained in the banding wire as it is fed to the machine by an apparatus which automatically controls the release of wire from the spool and also holds the tension as the band is laid on the armature. The device is installed in the shop of the Los Angeles Railway. The arrangement of pulleys, levers and brakes is in a wood framework approximately 2 ft. square by 7 ft. in height. It is located about 4 ft. in front of the banding lathe.

From the accompanying drawing it will be seen that the wire leaves the supply spool, which is carried on a shaft at the rear of the framework, to the feed pulley at the front of the apparatus. The path of the wire is such as to engage pulleys which are so mounted as to have an effect on releasing the brake mechanism and allowing the supply spool to revolve.

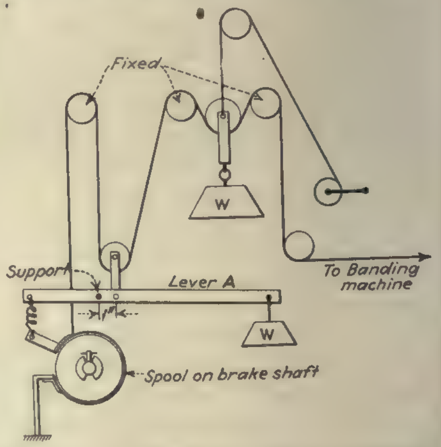
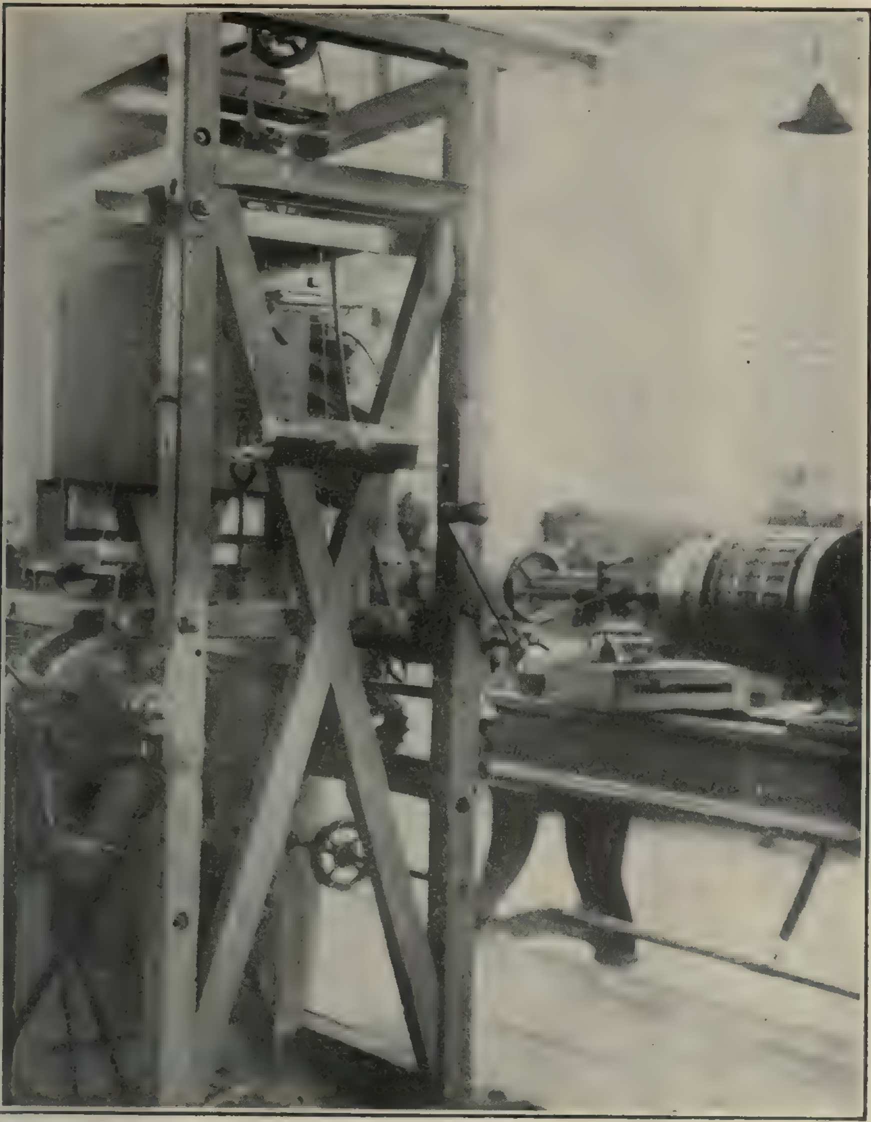


Diagram of Apparatus Which Maintains Proper Tension in Banding Wire and at the Same Time Holds That Tension When the Machine Is Stationary

The wire carried upward over a pulley, then down to a pulley mounted on a shaft, which in turn is fastened close to the fulcrum of a lever arm. This same arm extended carries the tension weight at the extreme end and at its other end operates the clamp which closes or opens the band brake on the supply spool. From this pulley the wire is carried to three pulleys at the top of the machine, thence down to the feed pul-



Banding Wire Is Maintained at the Proper Tension in the Los Angeles Railway Shop by an Apparatus Which Includes an Automatically Operated Escapement Brake and a Device for Maintaining the Tension in the Wire When the Armature Is Not Rotating. It Is Placed Approximately 4 Ft. in Front of the Banding Lathe

ley, which is a little below the level of the work in the adjoining banding machine. Of the three pulleys at the top of the machine two are stationary. The center one with weight attached may be lowered by a winch and rope. When lowered, the weight is hung on the wire to maintain the tension which ordinarily is set up by the rotation of the banding machine. Thus, when the machine is stopped for finishing off the banding, the tension is maintained until the wire is fastened. The movable pulley and suspended weight take care of this.

The frame of the apparatus is built up of 2½x2½-in. wooden members securely braced and anchored to the floor. This takes care of the pull of the banding wire, which for No. 16 gage steel wire, as used on the Westinghouse No. 306 armatures, amounts to 400 lb. For the No. 24 wire used on compressor armatures a tension of only 40 lb. is used. This pressure is measured by means of a spring balance connected in the line at the time work is started on an armature. By adjusting the weight applied to lever *A* the tension may be controlled.

A feature of the apparatus is the ease with which spools of wire may be changed. The flange of the spool has been drilled to take a long set screw which fastens the spool to the shaft. The shaft in turn is fastened by means of a removable pin to the brake drum. By loosening the set screw and disengaging the shaft pin it is possible to slip the shaft out endways and change the supply spool without disturbing the set-up of the machine. By placing a crank handle on the end of the shaft, it is possible to back off—that is, rewind on the supply spool wire which already has been applied to the armature.

The banding lathe used is a rebuilt engine lathe driven by a small electric motor through a worm. A pedal operated cone clutch controls the drive between the motor and the lathe.

Equipment repairs made in time
Will save "pull-ins" from the line.

Linoleum and Flexible Rubber Floor Covering

BELIEVING that a neat, clean and attractive floor covering will have a tendency to attract the public, the Wilkes-Barre Railway, Wilkes-Barre, Pa., has equipped one of its car floors with linoleum and flexible rubber mats. Underneath the cross-seats the floor is covered with a design to represent tile work. The edges of this are bound with a 1-in. brass strip neatly screwed to the floor. Though the center of the car and in front of the longitudinal seats the floor is covered with a flexible hard rubber mat made of ⅝-in. x 2-in. pieces of hard rubber spaced ½ in. apart and bound by steel strips. The linoleum and mat are on the same level. The mats have a clean surface at all times since all dirt falls through to the floor.

Designs of Linoleum and Flexible Rubber Mats Harmonize

This floor covering gives a very impressive appearance, and since the mats can be rolled up easily to permit sweeping this appearance can be maintained.

The linoleum, with its pleasing tile effect, and the brass binding strip create a pleasing interior effect.

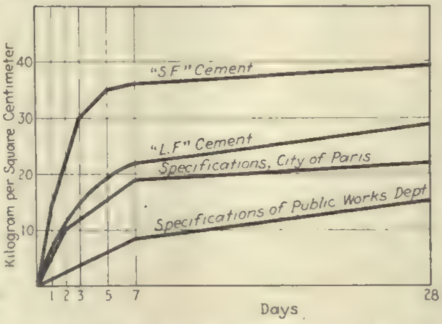
New Equipment Available

Time Saved by Quick-Setting Cement

CEMENT having high crushing strength and quick-setting qualities with a chemical composition which does not differ materially from ordinary cement is being made by the Société Coloniale des Chaux & Cements Portland of Marseilles, France, under the name "Super-Flambeau." It is handled in the same way as ordinary Portland cement. Its quick-setting feature does not hamper the mixing and pouring, which can be done at the same speed as when handling ordinary cement.

Advantages claimed for this cement on account of its strength and quick setting are; (1) Economy in wood plank forms, because the forms can be removed two or three days after the pouring; (2) economy in time, because the reinforced concrete object can be turned over as finished after five or six days; (3) general economy, because the sections of reinforced concrete girders, pillars, blocks, foundations, etc., can be reduced.

As a basis for calculation a strength of 100 kg. per square centimeter (1,420 lb. per square inch) on compression may be assumed. The strengths and setting time characteristics of S. F. cement are shown by accompanying curves.



Tensile Tests of Plastic Mortar Using a 1:3 Mixture of Super-Flambeau Cement

The chemical analysis of this cement is as follows:

	Per Cent
Soluble silica	22.10
Sand	0.20
Aluminum	6.70
Iron oxide	2.75
Chalk	62.00
Magnesia	1.62
Sulphuric anhydride	0.59
Ashes	3.65
Undetermined elements	0.39
	100.00

S. F. cement shows the following sieve test:

	Per Cent
Retained on 324-mesh sieve	0.0
Retained on 900-mesh sieve	0.1
Retained on 4,900-mesh sieve	0.9
Finest powder	99.0
	100.0

Mixed with 25.5 per cent of its weight of water at 15 deg. C., the cement will begin setting after 2½ hours, and will have set completely after 4½ hours, while exposed to humid air. Immersed in water, the setting will begin after three hours, and will have been completed after six hours.

Tensile and compression strengths of samples of S. F. cement, at various ages, are given in the two accompanying tabulations.

COMPARISON TESTS IN KILOGRAMS PER SQUARE CENTIMETER

Mixture	Number of Days One	Two	Three	Five	Seven	28
Cement—200 kg. Gravel—800 liters. Sand—400 liters. Water—5.7 per cent	66 65	131 127	165 161	204 195	215 201	248 263
Average	65.5	129.	163	200	208	255
Mixture Cement—250 kg. Gravel—800 liters. Sand—400 liters. Water—6.5 per cent.	72 72	152 158	190 193	245 251	281 282	325 336
Average	72	155	191	248	281	330
Mixture Cement—300 kg. Gravel—800 liters. Sand—400 liters. Water—7.2 per cent.	60 60	167 155	191 194	246 244	299 297	361 344
Average	60	161	192	244	298	352

ULTIMATE TENSILE STRENGTH IN KILOGRAMS PER SQUARE CENTIMETER

	Number of Days											
	One	Two	Three	Five	Seven	28	One	Two	Three	Five	Seven	28
Pure cement with 25 per cent water	33.6	35.1	39.5	53.0	54.1	....	243	311	383	494	550	...
	32.4	37.4	40.7	51.8	54.0	....	277	362	469	469	554	...
	24.1	32.6	43.1	50.8	59.2	....	238	29[illegible]	358	473	575	...
	29.8	38.2	49.3	54.0	53.0	....	247	366	507	511	469	...
	30.1	38.1	45.5	52.6	56.3	....	273	298	469	473	503	...
	27.9	38.4	44.3	50.1	59.8	....	251	332	383	503	567	...
Average	29.7	36.6	43.4	52.0	56.1	....	255	328	428	487	536	...
Maximum	31.5	38.0	45.1	52.8	57.4	....	262	343	457	495	562	...
Mixture 1 cement and 3 sand with 10.6 per cent water.	11.9	21.4	27.4	34.0	36.1	37.4	68	149	175	273	256	392
	12.0	21.2	31.2	31.9	31.7	34.5	64	145	192	256	277	358
	12.2	24.9	36.1	35.1	35.0	35.2	64	154	196	239	328	328
	12.0	20.4	26.4	32.6	39.1	35.4	60	158	200	268	281	358
	12.1	19.9	29.1	33.0	29.8	35.1	60	162	170	256	290	337
	11.9	23.2	29.0	34.1	32.6	38.2	64	149	213	260	277	324
Average	12.0	21.7	29.9	33.5	34.1	36.0	63	153	191	259	287	349
Maximum	12.1	22.4	31.4	34.1	35.7	36.6	65	156	200	264	294	361

The "Elimination of Waste Campaign" activity
Refers especially to the "Short Strand Shoddy" variety.

Improved Wiring for Switch Groups

IMPROVED design of main wiring for switch groups types 251 and 264 has been announced by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Use is made of the type 480 main wiring, eliminating many wiring troubles. New design of terminal studs permits assembling the switch units in place independent of the connection straps. Lock washers are used to keep the studs tight. In case any of the connection straps become loose in service the switch units are not affected. The connection straps can be removed without disturbing the switch units.

A cup washer replaces the two upper molded vulcabeston washers of the type 264 main wiring and the molded flat washer and thin cup washer, originally used on the type 480. It also replaces the fishpaper guard on top of the base plate. This new washer provides greater creepage distances and improved insulation. Shrinkage of the new micarta duck washers is much less than that of the vulcabeston. Where the new type of main wiring is used any shrinkage which may occur does not cause the connection on the straps to become loosened. This feature eliminates burning which occurs with the older design due to shrinkage and loosening of the straps.

New bent connection straps are used to replace the flat straps and copper spacing collars used with the old design. This eliminates the spacing collars, thereby reducing the number of contact surfaces and consequently the chance of burning if the straps become loosened.

Association News & Discussions

Co-ordination and Safety Discussed by Kentuckians

WHAT has been generally characterized by members as the most successful and interesting meeting in the records of the Kentucky Public Utilities Association was the two-day convention held at the Brown Hotel, Louisville, on Feb. 18 and 19, it being the tenth annual gathering of the organization. Business sessions were held on Friday afternoon and Saturday morning with the annual banquet on Friday night, in the Crystal Ballroom of the hotel, followed by a dance. The attendance was 278, while 389 persons were seated at the banquet.

From the standpoint of electric railway operators there were two talks of principal interest. One was by W. H. Sawyer, president of the American Electric Railway Association, who spoke on "City and Interurban Transportation." An abstract of Mr. Sawyer's address appears on this page.

Neil W. Funk, director of safety Louisville Railway, in discussing safety work, held that there was a time when the employer's first inquiry, following an accident, regardless of bloodshed and suffering, was "What's it going to cost us?" Everything else was secondary, instead of life and suffering being the first consideration. There were dangerous machines, poor lighting, and criminal negligence, no safeguards. Workers were so many foreigners, or what not. Mr. Funk held that no chances should be taken with the humblest of employees even to the losing of a little finger. The sentimental side of employment was stressed, and the argument made that even though the work did not save the company a cent it increased morale, affection of employees for employer, improved relations between capital and labor, and what was gained was well worth while, as it results in an organization. It results in a sense of loyalty where they have the inspiration given them by the company really caring for their welfare. He held that the safety movement was the greatest and grandest gesture that humanity has yet made.

President T. B. Wilson, in his annual address, touched on the electric railway and bus situation. He said that no one in the electric railway industry holds any doubts as to the future of that class of transportation in large cities. The electric car has demonstrated thoroughly that it will remain the backbone of mass transportation. The small city line still is a problem.

Harry Reid, president of the National Electric Power Company, New York, told of incidents in the growth of power and light utilities in Kentucky during the last twenty years. Mr. Reid, a former president of the association, entered the utilities field at Versailles, Ky., twenty years ago.

Officers for the coming year, as named at the conclusion of the program, were as follows:

President, W. R. Power, Ashland, Ky., general manager Ohio Valley Electric Railway, Huntington, W. Va.

First vice-president, Samuel Riddle, Louisville.

Second vice-president, L. B. Herrington, Louisville.

Treasurer, A. A. Tuttle, Louisville.

Secretary, E. F. Kelley, Louisville.

The new executive committee is composed of the officers, along with T. B. Wilson, Louisville, retiring president; J. P. Barnes, Louisville; W. H. Harton, Covington; J. P. Pope, Lexington; P. S. Pogue, Louisville; H. D. Fitch, Bowling Green; W. S. Cramer, Lexington, and H. J. Cochrane, Maysville.

Transportation a Community Problem[*]

By W. H. Sawyer

President American Electric Railway Association

PUBLIC utilities as a group have much in common, and especially are their aims and desires to serve their communities distinctly in common. There are, however, phases of the electric railway problem which appear to me more complex than those of any other industry.

The light and power and gas utilities meet their customers perhaps once a month. We meet ours twice a day, and every time we ask them for money. The major item of our expense is for employees who meet the public as our representatives. This item is comparatively an inappreciable portion of the expense of the electric light and power or gas company. We want our conductors and motormen to be courteous and helpful, and taking into account the conditions encountered, I believe we are far more than fairly successful, but I just want you to realize that with 30 per cent of our total operating expenses paid to motormen and conductors we have a real problem, and one that is seldom fully appreciated.

You electric and gas men have your peak loads, and satisfactorily to meet peak demand conditions adds to your responsibility, but only to a comparatively minor extent. It is an economic impossibility with the street car or with the bus to give every customer a seat during the rush hours. Nor is it always practicable even approximately to meet this desirable condition. If we were to give a seat to every passenger during the rush hour a 15-cent fare would not give as much net revenue as would a 10-cent fare if we carried during the rush hour standees up to, but not to exceed, the number of seated passengers. To obviate one of the most common complaints, therefore, is economically impracticable. Please keep in mind that I am referring to city transportation with either buses or street cars used to take care of all the transportation requirements. The public generally does not appreciate that with bus operation in the street car field the bus has to take care of only a portion of the total traffic. I have in mind particularly a more western city where bus service is given, paralleling and competing with the street car service in the cream of the traffic. The bus in this instance may give a seat for every passenger and charge but 10 cents, but it does not take care of all the traffic which may present itself. All it purports to do is to take care of traffic up to the seating capacity. When the blizzards and the rains come and the automobile user seeks public transportation it is the street car that must take care of his needs. Therefore, do not let yourself be misled into making an unfair comparison between the vehicle or system which takes cream traffic or limited traffic only and is not prepared at all times to take emergency and abnormal traffic.

Plenty of Advice in Operating Street Cars

There is one other peculiarity about the street car business. Our customers become so familiar with our cars and our schedules and are brought into contact with us so intimately and so often that they really think they know all about our business, although we who have spent a lifetime in it realize that we have yet much to learn.

There is one other feature with which you other public utilities do not have to contend. You furnish light, power or gas to all classes and conditions of people, rich and poor, honest and dishonest, white and black, but when the electric wires or gas pipes enter one's home those wires or pipes are considered personal and individual. They furnish service for that one family or that one industry. On the street car the bitterest enemies may of necessity sit or stand shoulder to shoulder. There is also that eternal human desire to take the first car though it be crowded and a comparatively empty car follows closely.

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[*] Abstract of an address before the Kentucky Association of Public Utilities, Louisville, Feb. 18, 1927.

I have served as an executive of electric light and power and gas companies. The same executive in charge of a joint light and power and railway property will spend of necessity three-fourths of his time on his railway problems. This is also a fair comparison to make for the gas company. You other utilities should not judge us solely by financial results. Our public relations problem, our intimate contact with the public, the conditions under which we must do business with our customers are more personal and individual than yours.

A year ago I was down in Australia, called there to make a report on a government-owned utility. I had every opportunity to study public ownership from the inside. In Australia there is, broadly speaking, no graft or corruption in connection with the operation of the public utilities. The employees of the publicly owned public utilities there are not subject to political changes. They are not selected for their political leanings.

Nevertheless, I came back from Australia with the most definite conviction that those theorists advocating municipal ownership of our public utilities were not only in error, but that if their theories were put into effect the results would be disastrous. I was forced to the conclusion in my study there that no set of men will administer a public property as economically and in as businesslike a manner as would that same set of men if their own money were invested in that property. It just is not humanly possible to expect as economical results from a property administered by politicians as from one privately administered. I might add, also, that there is no attempt over there to confiscate privately owned corporations, as has been so many times attempted here.

UNFAIR TRANSPORTATION COMPETITION INDEFENSIBLE

Before the war practically all our city and interurban transportation was by electric cars. Then came the jitneys, followed by makeshift buses, operated by the same irresponsible element that had previously operated the jitneys. The street car man had a rightful, definite prejudice against the jitney. This prejudice followed the earlier buses. But today the electric car man has little or no prejudice against the bus. He wants and needs the bus and recognizes it as a progressive transportation tool.

We do most definitely object to the uses to which buses are put by irresponsible pirates who seek to blackmail us and jeopardize our investments so that we will buy them out. In thus objecting we are acting for the best interests of our communities, which must eventually pay the cost of such destructive competition. We also have definite objections to the shortsighted bus manufacturer who will willingly be a party to such competition. Irresponsible transportation operation is always a public nuisance. Keep in mind also that the responsibility of the so-called independent operator is measured in part by his ability to pay a $100,000 loss if the bus you were riding in has an accident such as may happen and does happen at times even with the most careful of the responsible companies.

COMING MEETINGS
OF
Electric Railway and Allied Associations

***March 4*—American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p.m.**

***March 8-10* — Oklahoma Utilities Association, ninth annual convention, Huckins Hotel, Oklahoma City, Okla.**

***March 17-18*—Illinois Electric Railways Association, seventh annual joint convention, Hotel Abraham Lincoln, Springfield, Ill.**

***April 26-29*—Southwestern Public Service Association, convention, New Orleans, La.**

***May 31—June 1-2*—Canadian Electric Railway Association, annual convention, Winnipeg, Man.**

***July 27-29*—Association of Equipment Men, Southern Properties, 12th semi-annual meeting, Atlanta, Ga.**

***Oct. 3-7*—American Electric Railway Association, annual convention and exhibit, Public Auditorium, Cleveland, Ohio.**

I have said before and I say again that we will need and use many more buses in the future than we do today, but those buses should be and will be co-ordinated with electric cars. Undoubtedly there are communities and some interurban lines where the bus should and will entirely supersede the electric car. A number of electric car lines, both city and interurban, were built because they were community builders, and those who constructed them were building for the community's future. Real estate values were increased manyfold and the electric railway builder was welcomed with open arms. This would not have been true if these railways had not been constructed by responsible people with something worth while to offer, and it is essential that due and careful consideration should be given to the protection of these community investments to the greatest extent practicable.

TRANSPORTATION CHARGES TOO LOW

Today a very considerable number of people are using the privately owned automobile who previously used public transportation, but public transportation still remains a civic necessity if our communities are to grow and prosper. In that connection I want to draw attention to what I believe is a fundamental fallacy. There is entirely too much agitation for too low a transportation charge. I do not find fault with my neighbor because he wants to buy his ride cheaper, but I do say to him and to you that what he really needs above all else is service. I maintain that the better service would be worth far more than the extra pennies it would cost and that no better community investment could be made from the standpoint of economy and of prosperity. The day will come, too, when more money will not be forthcoming for needed improvements, unless the rate of fare pays the cost of the service, including the cost of money.

I believe that there are but few cities or systems where there has been as yet real co-ordination between street car and bus. The car must of necessity remain the vehicle to carry large masses of people at the lowest rate of fare. There is open a new and most attractive field for the bus, catering to those who desire a more expensive, more exclusive or faster service. The bus in semi-competition might carry a considerably less number of people per vehicle, give a seat to every passenger and make but comparatively few stops, or a limited car and local bus service might better serve the community. In many of our cities, even large ones, there are sections where, when the old track becomes worn out, new track should not be installed but buses should take the place of the electric car.

When I say that I see a broader field in many communities for the bus than has as yet been utilized, with that statement must go two others: first, the community must pay the cost of the ride whether it be by bus or electric car, or service such as I am speaking of is not possible; second, there must be co-ordination to the extent that is only possible when the electric cars and the buses are under one management and that management a responsible one.

There is also admittedly a prohibitive cost entailed if too much additional service is provided. There may temporarily be actual competition between the bus and the electric car. Such competition cannot eventually continue. It is against all economic laws. The community cannot afford to pay the price of duplicate service.

Referring directly to Louisville, I do not know what eventually will be the legal outcome of the bus competition and street car situation here, but I do know that eventually the people of Louisville cannot have a bus company in here taking away the cream of the traffic from the electric railway company and still continue to have that street car service which is necessary for their very lifeblood. An irresponsible pirate operating solely for his own benefit and under no obligation to serve all the people all the time has no moral right to take the cream of traffic and thereby weaken or break the organized transportation enterprise which operates under public control for the public benefit. I want here to commend those far-seeing bus manufacturers who with vision and foresight have so shaped their individual sales policies as to withhold aid or assistance to bus operators seeking to undermine the established transportation of a community.

When hard-headed business men like these bus manufacturers visage the fact and appreciate the necessity of doing business with responsible transportation companies, it would seem to me that there should also be a full community appreciation of the underlying facts and consequences.

BUS A MERCHANDISING VEHICLE

The bus has some undesirable features, due primarily to the mechanical limitations of the present status of the art, but the bus is a merchandising vehicle and we electric railway men must go farther than we have in our appreciation of what the bus can do, not only as a transportation vehicle, but as a selling and merchandising tool, a vehicle with many features inviting to our customers. We recognize that we cannot meet the competition of the private automobile and other new and changed conditions of today if we continue to operate the same cars under the same conditions as we did ten years ago. We must not only modernize our equipment, but we must do what a considerable number of the progressive properties down in this part of the country are doing. Take the Louisville Railway, the Kentucky Traction & Terminal Company, and the Interstate Public Service Company—three properties with which I happen to be reasonably familiar—they are not doing today what they were doing ten years ago. There is a new order in effect. Their car equipment is meeting today's conditions, and further, these companies are recognized nationally as leaders in a public relations policy, in a desire to satisfy their customers. It remains for the people of these communities, as of communities elsewhere, to choose and be given just the kind of transportation service they desire, but I must say again, and I say it in no mean way, that they must pay the cost of the service rendered. Here are men able and willing, and the financial groups behind them are able and willing, to go forward as distinct assets to the community served. It is for the public—our customers—to decide, but I believe that I as a representative of the electric railway companies would not be doing my duty did I not point out the underlying facts.

Air Brake Requires Proper Installation and Maintenance*

By W. M. C. HORNER

Mechanical Expert Westinghouse Air Brake Company

FOR many years the installation of the brake equipment on electric cars in many cases did not receive the consideration it merits. Consequently there are a great many cars which have been in service for a number of years that are equipped with brake cylinders much too small to provide a satisfactory brake and at the same time keep the leverage ratio within the prescribed maximum of 12 to 1. There are some cases where cars have had as high as 18 to 1 total leverage. Inasmuch as this is a subject in which every operating man is interested, I wish to take this opportunity to review a few of the essential factors involved in the design of an efficient air brake.

First, as to pressure: If more than 2 per cent braking power per pound of cylinder pressure is attempted, a very high braking power for light cylinder pressures is obtained and, therefore, the cars cannot be handled without shocks at low speeds, and either the range between the maximum and minimum braking power obtainable must be very narrow or else wheel sliding will result when the maximum power is used.

Second, as to area of brake piston: If the ratio of cylinder piston area to cylinder pressure is excessive, it means either a low leverage, which means great shoe movement, or higher leverage with low pressure, which means very narrow range between maximum and minimum braking power.

Third, as to leverage: If the leverage is too low, it means excessive air consumption and too much shoe movement; if too high (that is, brake cylinder too small for weight of car, and it is here that the principles governing brake design are violated most frequently), smooth and accurate handling of the car or train becomes impossible and the shoes are constantly grinding on the wheels, consuming energy, wearing out the shoes and causing loss of time; or else piston travel must be lengthened out, thus greatly increasing the air consumption, lengthening the time of application and release and reducing both service and emergency braking power. The high leverage makes necessary a frequent adjustment of piston travel. Otherwise a constant and very rapid decrease of braking power will result. If high leverage is accomplished at truck levers, it necessitates low hung brake shoes, which, when suspended from a spring-supported part of the truck, will result in great increase of piston travel and consequent decrease of braking power with the loading of the car. The action of the brake itself tends to compress the truck springs and magnifies this condition. Consequently when the air pressure in the brake cylinder is released and the car is unloaded the brake will remain applied because all the shoe clearance has been absorbed by the false travel. This always occurs at a time when readjustment of piston travel is impracticable and when instead of a decrease of braking power an increase is greatly to be desired. In addition, the danger of the levers fouling is increased, particularly where the truck leverage ratio is high, and for that reason very frequent and careful inspection is required or the total loss of the brake may result.

SATISFACTORY BRAKES REQUIRE PROPER INSTALLATION

All of the preceding could be very much elaborated upon, but it is thought that enough has been said to show that the braking problem warrants careful consideration with regard to both the kind of brake and its proper installation.

Coming to the mechanical requirements of the foundation brake gear, the most desirable features in connection with this matter are a motor truck that will permit a brake design providing a lower truck leverage ratio and an unobstructed movement throughout the range of brake shoe wear—say 1⅛ in. There should also be provision in motor truck construction for the best location of the brake shoes on the wheel and suspension of the brake head or beam hangers at a proper angle and at such a point on the truck as will maintain a fixed location of the shoes on the wheel, regardless of whether the car is light or loaded.

Economy and safety are prime requirements in railway operation, and as the brake is a most vital safety factor it should have consideration commensurate with its importance. In the design of cars and trucks, ample space should be allowed for the application of the proper brake equipment, including a suitable foundation brake gear right down to the brake shoes. In the event of piston travel adjustment being neglected, the piston should strike the head before the radius bar, or levers foul.

SATISFACTORY PERFORMANCE LIMITS LEVER RATIO

While a total leverage of from 9 to 1 or a maximum of 12 to 1 is proper, yet the total truck leverage ratio should not exceed 6 to 1; i. e., 1 lb. exertion on the truck pull rod should not give more than 6 lb. of force distributed at the four wheel shoes. This, of course, would mean a ratio of 3 to 1 for each truck lever, but 2½ to 1 is even preferable. This latter would mean a total truck leverage ratio of 5 to 1. When this is exceeded, the travel of the top end of the lever becomes too great as compared with shoe wear. In addition the shoe has to be placed very low on the wheel and there is increased danger of the lever fouling on the shoe. The lower the truck ratio is held the less change of angle there is for a given shoe wear.

UNIFORM PISTON TRAVEL IS IMPORTANT

Proper provision should be made for maintaining as near a uniform piston travel as practicable for the following reasons: (1) That the air consumption may be kept low; (2) that the braking power may always be uniform, and (3) that a full power brake is assured at all times. For satisfactory brake operation the following factors should be considered: Release springs of proper strength; brake shoes of proper thickness, area and friction; live and dead truck levers of the same proportion when motors are on each truck axle, or, if otherwise, proportioned to allow for motor and non-motor axles; ample provision for take-up of shoe wear, slack, etc.; levers and rods so proportioned that they will be at right angles to each other when brakes are fully applied; elimination, as far as possible, of lost motion in journal boxes, pin holes, center plates, etc. The car should have reasonably large truck centers to admit of proper connection of body levers to truck levers by means of pull rods; the hand brake should be equalized and the multiplication made so that a large force can be applied to the hand brake chain with comparatively small amount of chain wrap-up.

An important phase of brake maintenance which is often troublesome at this season of the year is the question of moisture in the air brake system. The amount of this moisture, of course, depends on the humidity of the atmosphere at any given time. Frequently these atmospheric conditions are such that a considerable quantity of water will enter the air brake system. The water contained in the air is in the form of a vapor which saturates the air to a lesser or greater degree. Relative humidity is expressed in percentage and is a measure of the degree of saturation of the air at any given pressure and temperature. If air is at 100 per cent humidity it contains all the moisture it can hold at that pressure and temperature. When the pressure of the air is changed the ability of the air to hold moisture changes. As the pressure is increased the ability of air to hold water is decreased. The effect of temperature is exactly the reverse; as the temperature is increased the ability of air to hold moisture is increased.

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*Paper delivered before meeting of Central Electric Railway Master Mechanics Association, Toledo, Ohio, Feb. 3, 1927.

As air is compressed its temperature increases. Consequently there is little moisture in evidence near the compressor or for a considerable distance beyond, even though the pressure has been increased. However, as soon as the air cools down its ability to hold moisture at the increased pressure decreases. All the moisture which is present in excess of the amount necessary to saturate the air 100 per cent will be deposited in the reservoir or cooling pipe. The amount of water deposited depends on the percentage of moisture in the air when it is drawn into the compressor. After the air is thoroughly cooled to the atmospheric temperature it will be more or less expanded as it passes into the air brake system. This expansion will, of course, further cool the air, but the reduction of pressure and the tendency toward increase in temperature due to the then higher atmospheric temperature will operate to keep the air dry; i. e., at less than 100 per cent saturation.

WATER CAUSES MANY TROUBLES

The presence of water in the air brake system is decidedly objectionable from two standpoints: (1) Because of the harmful action of moisture on the working surfaces of air brake devices, and (2) because of freezing. Moisture distributed in the air brake system causes rusting of the interior iron surfaces, and frequently this rusting action is extremely rapid because of certain gases which are present in the atmosphere. These gases, such as carbon dioxide, tend to make this moisture of an acid nature. When water is present in any considerable quantities it tends to wash the rust and other dirt that may enter the air brake system into the triple valves, emergency valves and other devices, with the result that the operation of the brake equipment will be errratic, or even defective, unless the equipment devices are frequently cleaned. The cleaning of air brake devices is an expensive proposition and is frequently unnecessary if proper means are employed to eliminate moisture.

The freezing of moisture in the air brake system is, of course, a well known objectionable feature, because all air operated devices can be blocked by ice and rendered inoperative if sufficient moisture is present under such conditions. The solution of this problem is, of course, to keep the water out of the air brake system. This can only be done where an adequate cooling system is installed. There are many railway cars now in service which have adequate cooling facilities provided in the main reservoir portion of their brake systems, and these operate daily in severe cold weather without freezing troubles. There are other brake installations which are not so satisfactory and therefore need a carefully planned arrangement of radiating pipe to obtain the desired cooling effect.

Unless care is taken in the installation of radiating pipe the full effectiveness will not be obtained. Sufficient length of pipe is often installed, but it is located above the sills, where it does not get a free circulation of air, and very often it runs close to resistance units which throw off considerable heat, thereby defeating the purpose of the installation. When radiating pipe is properly installed freezing troubles can be invariably eliminated.

FREEZING ELIMINATED ON THE N. O. P. & L.

Last winter the Northern Ohio Power & Light Company had a real epidemic of freezing, which was attacked in a real business-like fashion by making certain changes along the lines referred to above, that gave satisfactory results. The changes on some of the cars were rather elaborate and involved considerable expense. However, I believe Mr. See, master mechanic of that property, will tell you that the cost has been repaid. The man who thawed out cars last winter told me the other day that he formerly used 2 gal. of gasoline every day in a blow torch, but that he forgets to bring the torch out most of the time now as he has no need for it.

By way of contrast, it might be interesting to mention another property that could not be convinced that radiating pipe, properly installed, could be depended upon to obtain the desired results, and therefore refused to use it. In order to protect its equipment against freezing the emergency valve, governor, quick release valve, main reservoir cut-off valve and a combined check valve and strainer were installed in a well-made box which was lined with felt. In spite of this there was freezing, which was later eliminated by installing two 23-watt lamps inside the box along with the apparatus. On tests made when the outside temperature was 12 deg. below zero the inside of the box registered 36 deg. I have examined the valves on this property a number of times and have found that in two months the inside of the valves have become very rusty, showing the presence of considerable moisture. It is necessary to clean these valves every two months.

I have just examined several valves which have been in service approximately twelve months on a property where freezing is avoided by eliminating moisture by radiation and found the emergency valves in very good condition, free from rust and evidence of moisture. The difference in maintenance expense as compared with the other road mentioned where the valves have to be removed, cleaned and lubricated every two months is obvious.

I wish to lay special emphasis on the desirability of suitable protection of the air compressors against the entrance of dirt. If an air compressor is kept clean it will run almost indefinitely without excessive wear. It was my privilege recently to examine some compressors which had been in service for six years on a property which has no regular general inspection or overhauling periods for compressors. The only time they get to the shop is when something goes wrong, but they have a very efficient suction strainer arrangement. The oil was almost entirely free of any sediment, the gear and pinion were in fine shape, it was only necessary to take out one shim in the connecting rod crankshaft bearing and we could detect only 0.0015 in. wear in the cylinders. The condition of this compressor showed very forcibly how simple it is to increase compressor life with very little cost for maintenance if clean air is furnished at the suction.

I would like to add a word or two concerning the composition packing which our company developed primarily for brake cylinder packings, but which is now being substituted for leather in all air brake devices except in a few cases where leather seems the best suited. We were obliged to go into the manufacturing of composition packing for brake cylinders because of the tendency of leather cups to lose the filler with which they are impregnated, causing them to become porous in a short time.

The new material, known under the trade name of "Wabco," is highly oil resisting, which insures against excessive brake cylinder leakage during the life of the cup. The packing cups are made fairly firm in order that a uniform bearing be maintained against the cylinder wall without the aid of an expander ring. Therefore, it is necessary to exercise reasonable care in handling, in order that the material is not cracked or broken before being installed. Rubber, which is used as a base in this composition, has a natural tendency to vulcanize with age. This results in gaskets becoming harder than they should be when carried in storeroom stock for a considerable period. Gaskets that appear to be too hard for application to a device can be softened temporarily by soaking in warm water for a few minutes. We recommend that not more than a six months stock be carried.

Men of National Prominence to Address Oklahomans

SEVERAL men of national prominence in the public utility industry will address the ninth annual convention of the Oklahoma Utilities Association at the Huckins Hotel, Oklahoma City, on March 8, 9 and 10. They include L. S. Storrs, who will address the morning session; Frank LeRoy Blanchard, New York; H. S. Bennion, New York; Martin L. Pierce, North Canton, Ohio; H. O. Caster, New York; W. S. Vivian, Chicago; H. B. Flowers, New Orleans; Samuel A. Chase, Mansfield, Ohio; Earl W. Hodges, New York. The latter will be the principal speaker at the annual banquet to be held at the Oklahoma Club on Wednesday night, March 9.

The News of the Industry

Higher Rates in Fort Worth

Northern Texas Traction Hopes to Sell 5,000 Nickel Passes a Week—Intensive Campaign

Negotiations between the city of Fort Worth, Tex., and the Northern Texas Traction Company culminated on Feb. 1 in a unanimous vote by the City Council granting a fare adjustment. The conferences occupied only about two months. The company made formal application on Dec. 1, 1926, to the Fort Worth City Council for an adjustment of the rates. The rates finally agreed upon and mentioned in the ELECTRIC RAILWAY JOURNAL issue of Feb. 12, page 307, were: Cash fare, 10 cents; three tokens for 25 cents; nickel pass at 40 cents a week, plus 5 cents per ride; half fares, 5 cents cash with six tokens for 25 cents.

These new rates replace a 7-cent adult and 3½-cent children's fare. Fares on the motor coaches remained at 10 cents straight, this fare entitling the rider to transfer to and from cars.

The new rate embodied in the nickel pass is a departure. With twelve rides a week, the average fare on the ticket is 8⅓ cents. In its plea before the Council the railway stated that from 25 to 30 per cent of its passengers would ride on the nickel pass.

Having sold the nickel pass idea to the City Council, the next job on the part of the railway was to sell it to the public. This was accomplished by holding a week-end bargain sale of street car rides. On Feb. 2 at noon the operators on every city car handed a pamphlet to every street car rider. This pamphlet reproduced the nickel pass, good until midnight Feb. 6, and invited the public to use it with the railway's compliments. The result was that within 24 hours practically everybody in Fort Worth understood the nickel pass, how it worked and what its possibilities were. The effect was, of course, to carry everybody for a 5-cent fare from Feb. 2 noon until midnight of Feb. 6. During the 4½ days the riding increased about 10 per cent, while the city revenue decreased about 20 per cent. In addition a kindly feeling was created among the public that brought the railroad many compliments. It is the plan of the company to have the public educated to the point where it can sell 5,000 to 6,000 nickel passes a week.

The railway at Fort Worth, in addition to handing out the explanatory pamphlets, had inspectors and commercial representatives canvassing all of the stores and large establishments, giving out booklets describing the nickel pass. The result was that the railway received checks from a number of concerns to cover passes for all of the employees. Some concerns presented these to their employees with their compliments. For example, the railway sold Sanger Brothers, one of the leading department stores, 300 nickel passes at 40 cents each, and to another concern it sold 100. The railway hopes to make this a permanent arrangement and to intrigue other concerns to follow suit.

As a preliminary to the installation of the new fares the company has been holding meetings of its city trainmen and adopting many novel stunts, with the result that when the new rates went into effect on Feb. 7 the company had about 500 of the most enthusiastic salesmen ready to do duty. The complete application was reproduced as a page "ad" in several of the daily papers and pamphlets addressed "To Our Patrons" were distributed to many outbound passengers.

In addition to the beneficial effects of the new fares on the infrequent rider, the casual rider and the wholesale rider, the management sees an added advantage in the new schedule, namely, the getting away entirely from odd pennies. This is considered to be a tremendous help in speeding up service and relieving platform congestion, as service on the city lines is 100 per cent one-man.

Utilities Not Stressed in Messages

Only Slightly Do Governors' Addresses Affect Railway or Bus Industry—Motor Vehicle, Home Rule and Commission Regulation Mentioned

LEGISLATIVE sessions are being held this winter and spring in nearly all the states. Of the messages studied little is said on the subject of public utilities. Most of the governors made no plea or promised no legislation for the railways or their subsidiaries, but many of the chief executives stressed the need for continued construction and development of the highway, discussing in connection with the good road movement, the importance of renewed vigilance of safety for the public. The states from which this message of highway development emanated included New Hampshire, Maine, Delaware, Montana, South Dakota, Vermont, Minnesota and North Dakota. Of the 35 addresses to the various legislative bodies considered seventeen contained some pertinent remarks of interest to utility operators. This proposed legislation would affect motor vehicles, gasoline and other taxes, service commission duties, bus regulation and home rule. These were made in the states of New York, New Jersey, Ohio, Maryland, Rhode Island, Tennessee, Pennsylvania, Kansas, Oregon, Washington, North Carolina, Iowa, Connecticut, Wisconsin, Idaho, Massachusetts and California. Extracts of the messages in New York, New Jersey, Ohio, Maryland, Massachusetts and California follow:

NEW YORK

Governor Smith of New York called attention to the still unsolved phase of home rule, namely, the administration of local public utilities. He said that he had consistently called attention to the injustice to local governments brought about by the amendments to the public service law, made in 1921. In his opinion the state should return to the municipalities the free hand they once had to deal for themselves with the corporation with which they made contracts at any time in the past. He was never able to find any fault with a policy of decentralization that would delegate to municipalities, where they desired to exercise it, the right of the state to regulate all public utility corporations operating wholly within their borders. The state should be empowered to delegate to localities when they so request or to an agency established and designated by the local government the regulatory powers now held by state agencies. He said: "It is time we ceased to hamper the freedom of municipalities to own and operate public utilities. Public ownership and operation are not untried theories."

The successful co-operation between the public at large and the officials charged with the administration of the motor vehicle law was in no small measure responsible for the decrease in deaths due to motor vehicle operation during 1926 compared with the year previous.

NEW JERSEY

The problem of improved transit facilities among the communities of northern New Jersey and between those communities and New York City, which has been the subject of serious study by the North Jersey Transit Commission, was referred to by the Hon. A. Harry Moore, Governor of New Jersey, in his message to the 151st Legislature. He said that this commission would report as to the progress of its work during the 1927 legislative session, that a careful study of that report would serve not only further to demonstrate the far-reaching importance to the state as a whole of these studies but also the tremendous difficulties and the enormous amount of work confronting this unsalaried commission before there could be solved the legal, financial and engineering problems involved in the establishment of a rapid transit system functioning not only within the boundaries of New Jersey but requiring, as well, the crossing of the political geographical barrier of the Hudson River. He said that such a plan, when fully developed, would affect in one way or another every railroad with terminal facilities on the west bank of the Hudson and would require the active co-operation of the authorities of New York for its practical realization. Much work remains to be done.

OHIO

On the subject of public utilities, Governor Donahey asserted it was the duty of this session to submit three names for an entirely new commission, because of the failure of the last Ohio Senate to confirm his appointments to the Public Service Commission. The law, however, contemplated the appointment of only one new member every two years. He said the new appointment would be sent to the Senate for consideration in the near future and asked the present Senate not to adopt the policy of the two preceding ones in permitting important appointments to lie dormant in committee for weeks or months. He said that after consultation with the new commission he proposed to submit for the Legislature's consideration some concrete recommendations as to needed statutory changes in methods of operation and procedure of the Public Utilities Commission. He recommended an excise tax on motor transportation companies operating as public utilities "which up to this time have escaped this form of taxation," and this in addition to the special taxes which are paid for the privilege of using the streets and highways for the purpose of transporting passengers and property for hire.

MARYLAND

Gov. Albert C. Ritchie told the General Assembly of 1927 that experience had shown that certain amendments were needed to strengthen the powers of the Public Service Commission. He said that among the measures that would be submitted in this connection were bills providing for indeterminate rate orders; requiring the consent of the commission for the abandonment of franchises acquired and exercised before as well as after the enactment of the public service commission law; empowering the commission to fix the minimum as well as the maximum rates; empowering the commission to suspend proposed rates, pending a determination of their reasonableness; authorizing joint investigations, hearings and orders in conjunction with the commissions of other states or of the federal government in the case of interstate utilities, and restoring the office of general counsel to the commission.

MASSACHUSETTS

Gov. Alvan T. Fuller, speaking before both branches of the Legislature on Jan. 6, recommended further consideration of a gasoline tax of 2 cents a gallon with a corresponding reduction in the present registration fees. This would have the advantage of raising a substantial amount from visiting tourists, he claims, who now contribute nothing toward the upkeep of the highways.

On the subject of public utilities, he said that the Department of Public Utilities should be responsible to the public for establishing and maintaining reasonable rates. The Public Utilities Commission should be the guardian of the public interest. It should require reports and be able to analyze them so that a proper relationship could be secured between returns to the stockholder and charges to the consumer, "always bearing in mind that the consumer has not been afforded that best protection which can be given to any consumer, namely, competition for his patronage." The advantage of this competition had been denied him by giving utility companies a monopoly. He asked if it were not surprising that all public service companies had not learned the lesson that the interests of the company could be best served by meriting the confidence and good will of the public.

On the control of public utilities he recommended legislation to meet the situation of public utility companies passing under the control of interests outside the state through the medium of holding companies. He quoted Section 10 of Chapter 181 of the General Laws and recommended that the statute be amended so that it would provide that whenever it should appear that a majority of the common or other stock having voting power in the domestic company was owned or controlled by a foreign corporation the Supreme Judicial Court should have jurisdiction in equity to dissolve such domestic company. As there were a number of these holding companies organized under the laws of the Commonwealth, the amendment to the law should be so drafted as to apply to holding companies, whether domestic or foreign.

Governor Fuller's message stressed the problems growing out of the Boston Elevated Railway, with its varied equipment for transporting the public. Among other things he suggested for public consideration legislation continuing the present public control of the Elevated for a period sufficient to effect a substantial decrease in dividends and interest. The assurances necessary to obtain these concessions in the return to be paid on capital could be given without actually involving the treasury of the Commonwealth in the least or binding the public trustees to do more than keep fares at a proper rate. In all that is done he believed the two great objects of suitable transportation and the lowest possible expense for the capital required ought to be kept constantly in mind.

CALIFORNIA

In his address before the Legislature of California on Jan. 4 Gov. T. S. Young recommended that the present Legislature provide for a commission to investigate whether the existing tax system, with periodic justifiable increases in the public utility tax rate, would continue to provide necessary revenues for the state's normally increasing expenditures, and if not, what modification should be made in the present system to put it on a safe, permanent and equitable basis.

Tacoma Survey to Be Concluded

Officials of the Tacoma Railway & Power Company, Tacoma, Wash., have interviewed thousands of Tacoma citizens in the past few weeks in an effort to get data on what the public thinks of the city's railway service, and to learn what is wanted by the public in the way of additional or improved service. The survey is being made by the Beckmann-Hollister Company, San Francisco, with Miles F. Hollister of the company personally directing the work. The City Council and Mayor Melvin G. Tennant have been co-operating with railway officials in an effort to solve the railway problem.

New Reserve Clause Inserted in Kansas City Franchise

A reserve fund for maintenance purposes of approximately $400,000 will have to be set up by the new Kansas City Public Service Company, Kansas City, Mo., under a clause just inserted by the special committee in the proposed franchise. The reserve fund would be created gradually out of the earnings of the company and could be used only for emergencies. It is thought that this reserve fund is the only new feature not already made public that will appear in the proposed franchise, a 30-year grant to replace the one under which the company is now operating. The other terms of the franchise are said to follow closely the committee's recommendations made to the Council last December.

The new franchise is virtually ready to be presented to the Council. It remains only to be drawn up legally. One more meeting of the committee will then take place before the franchise is presented to the Council. After its introduction in the Council the grant would be referred to a committee, which would hold a public hearing within a week. The measure would come up for passage at the third reading in the Council.

Rearrangement of Akron Operation Proposed

A. C. Blinn, vice-president and general manager of the Northern Ohio Power & Light Company, Akron, Ohio, has proposed a plan for changing railway and bus routes and schedules in Akron that will save approximately 1,600,000 operating miles annually, better the service and decrease operating costs. It will be put into effect when approved by City Council.

Alterations proposed by the company will help keep city bus and car fares down by enabling the company to reduce its operating losses on the Akron transportation system, Mr. Blinn told councilmen. He said:

> N.O.P. transportation operations went heavily into red ink during 1926, as against a net of $48,813 after taxes in 1925. If we fail to operate with a profit this year, there will be no alternative but a higher fare when we seek a new franchise in 1929.

The transportation changes affect duplicating operations during dull periods, which eat heavily into operating costs, according to Mr. Blinn. Improved service is planned in rush hours.

New Proposals Expected in Toledo

Following a lull of two months in railway negotiations at Toledo, Ohio, which were aiming at a revision of the Milner ordinance or a complete new plan of unified traction and bus service it is believed some new proposals may be made soon by the representatives of the Community Traction Company. An ordinance was prepared but after receiving disapproval of the street railway board of control and a special committee of the Chamber of Commerce was abandoned for the time being. Possibly the new negotiations may seek to use this ordinance and the construction suggestions as a basis for a new plan. Original negotiations to secure better service, lower fares and better street paving and maintenance arrangements were started nearly two years ago and involved a study of the transit system of Toledo by Prof. H. E. Riggs of the University of Michigan.

The Rocky Mountain Canary Carols Its Tune in Denver

In the city of Denver, Col., there is an eight-page paper, 12 in. x 17 in., called the *Rocky Mountain Canary*. It is published every Saturday and the Denver Tramway is evidently one of the main distributors, the paper being placed in an open box in a prominent part of the cars, a sign thereon reading "Take One." Ten thousand copies are printed each week. In every edition there is an invitation to the public to submit a slogan for the big placards carried on the front of all the company's cars. The prize to the winner of slogan contests is 100 car checks, of a value of $7.50.

As a sample of the winning slogan, the issue of the *Canary* for Jan. 22 prints: "Denver gets you in the end. It's a great place to live."

In the same issue the tramway offers a $5 prize for the best letter of not more than 100 words on "Why I Ride the Street Cars." For any other letters on the subject that are used by the *Canary*, $1 is paid, and then the *Canary* is going to print news of grocery bargains close to car lines, clothing bargains, meat bargains, etc., and says that in this way "we will make your car slugs pay."

Rehearing on Syracuse Fares

Chairman Prendergast of the Public Service Commission on Feb. 17 heard the application of Mayor Hanna of Syracuse for a rehearing on the order of the commission establishing a rate of seven tickets for 75 cents, 10 cents cash fare, on the New York State Railway Lines in Syracuse. The commission had previously denied the application for a suspension of the order dated on Feb. 2, to be effective Feb. 10, pending this rehearing.

The city's request for a rehearing was based on the valuation of the property of the company and the order requiring that tickets be sold in blocks of ten for 75 cents, which it believed was injustice to the small wage earner. Mayor Hanna petitioned the commission to require that two tickets be sold for 15 cents with four tickets for 30 cents. The railroad maintained that the order of the commission was fair to all parties and that to increase the number of transactions by selling tickets as suggested by the city would delay the operation of cars. Decision on the application for rehearing was reserved.

Relief from Paving Cost Sought by Detroit Municipal Railway

Upon the suggestion of Del A. Smith, acting general manager of the Department of Street Railways at Detroit, Mich., the City Council has passed a resolution instructing the Corporation Counsel to prepare a charter amendment to relieve the municipal railway of the burden of paving between tracks. The amendment will place the cost of such paving between tracks on the general tax roll. The matter will be voted on by the people at the April 4 election.

In bringing the subject to the attention of the Council, Mr. Smith cited that between July 1, 1925, and Dec. 31, 1926, the D.S.R. expended $542,652.02 in paving between tracks. John C. Lodge, president of the Council, in commenting on the proposal, cited that under the present system of making the car rider pay for the pavement between tracks. Mr. Smith cited the general tendency to relieve street railways of the paving burden, and said that the money expended in this direction in Detroit, if diverted to exclusive railway purposes, would most certainly add materially to transportation facilities.

Postponement in St. Louis on Fare Hearing

Three federal judges, including two district and one appellate jurist, were not available at Kansas City, Mo., on Feb. 15 so the hearing could not be held on the application of Rolla Wells, receiver of the United Railways, St. Louis, Mo., that its 8-cent basic fare rate be made permanent. A postponement until Feb. 25 was ordered by United States District Judge Reeves, who issued the temporary restraining order against the Missouri Public Service Commission and other state officials under which Receiver Wells put the new rates into effect on Feb. 7.

Prior to announcing the postponement of the hearing Judge Reeves in Chambers listened to motions by City Counselor Muench of St. Louis and Attorney-General Gentry on behalf of the state, and J. P. Painter, counsel for the Missouri Public Service Commission, for a dismissal of the case on the grounds that the federal court lacked jurisdiction. The judge indicated that the points raised had caused serious doubt in his mind as to the right of the federal court to assume charge of the rate question. These motions will be taken up first on Feb. 25, when Judge Kimbrough Stone of the United States Court of Appeals and Districts Judges Reeves and Otis will pass on the case.

City Counselor Muench contended that inasmuch as Receiver Wells on behalf of the company on his own motion had appealed to the Missouri Public Service Commission for a higher fare no action in the federal court should be had until the state commission has handed down its decision. The commission has had the rate question in charge since last June. However, Receiver Wells has contended that the state body has needlessly delayed a decision and that its failure to act has resulted in the confiscation of the company's property in violation of the United States Constitution.

Early Subway Building Is Promised by Chicago Mayor

Assurance that Chicago's vital subway question would be disentangled, for the time being at least, from the main body of local transportation problems now confronting city and traction officials and apparently destined to indefinite delay was given by Mayor William E. Dever in a pre-election address on Feb. 17.

The Mayor revealed that a subway ordinance drawn up by Major R. F. Kelker, Jr., city engineer, in conformity with the Mayor's own recommendation and, in many respects, with the report of the citizens' subway commission, will be reported to the local transportation committee of the City Council in the next few days.

Mayor Dever has incorporated subway construction along the lines proposed in this ordinance as one of the chief planks in his campaign for reelection next April and is demanding immediate action toward that end.

He indicated that if the ordinance should be approved by the Council, it will probably be submitted to the voters at the judicial election in June. Then, if the referendum is carried, assessment proceedings will be started in the courts and construction begun at once.

Local regulation of public utilities is another important plank in the Mayor's platform. A petition sponsored by Mr. Dever is now being circulated by his party workers for a referendum on the question of home rule on April 5, the date of the mayoralty election. In order to give the city of Chicago control over its local utilities, enabling legislation must be obtained from the State Legislature at Springfield.

Railway Project in Missouri

Willard E. Winner, pioneer developer, has associated himself with several citizens of Liberty, Mo., in the organization of a company to build and operate an electric railway from Liberty to Kansas City. A corporation capitalized at $300,000 is being formed. The projectors plan to cross the Missouri River with their line at a point east of the city limits of Kansas City, at which place the river is especially narrow. From the river the line would go almost directly to Liberty, passing just east of Birmingham. At a point 3 miles out of Liberty there would be a branch east to the Atwood quarries.

The men listed as directors are: Lee Clark, Mayor of Liberty; C. P. Atwood; A. W. Lightburne; J. A. Reed; Robert Don Carlos, circuit clerk of Clay County; Pascal Parker; Harry Griffith; E. T. Brant; J. W. Pryor; J. S. Conway, and W. E. Barnes, city engineer of Liberty.

New Crimson Limited in Texas Makes 1927 Appearance

The new 1927 Crimson Limited operated by the Northern Texas Traction Company between Dallas and Fort Worth was placed in service on Feb. 12 after having been exhibited in Fort Worth on Feb. 9 and in Dallas on Feb. 11. The new model was described in the ELECTRIC RAILWAY JOURNAL, issue of Feb. 5, page 246. Whereas the trailer is practically the same as on the new train put into service last October, the motor car has been completely changed, the biggest improvement being a very comfortable, heavily upholstered, genuine leather bucket seat.

In spite of the rain and sleet more than 1,100 people went through the train when it was exhibited and received a copy of the pamphlet describing service. Another 1,000 people went through it in Dallas in the Interurban Terminal. A check-up on the riding in Fort Worth reveals that already a number of local people who have been using their automobiles between Dallas and Fort Worth have now gone back to the interurban.

On the occasion of the installation of the 1927 Crimson Limited the company distributed an interesting and informative booklet on the advantages of riding in this de luxe interurban. The purpose of the booklet was to get the public to thinking along proper lines on the place of the bus and interurban in transportation.

Another Fare Hearing in New Jersey Case

Decision on motion made on Feb. 16 to dismiss the application of the Public Service Transportation Company and the Public Service Railway, Newark, N. J., for adjustment of fare zones on eleven bus lines and one railway line will be reserved by the Board of Public Utility Commissioners of New Jersey until the entire case has been presented.

This was announced in an opinion by the board, at which motion by counsel of affected municipalities to adjourn the case three months was denied. The board set March 21 and 25 for the next hearings. In delaying decision on motions for dismissal, the board said:

> At the close of the testimony given by the petitioners counsel for the various municipalities addressed motions to the board to dismiss the petitions on the grounds of lack of jurisdiction on the part of the board and also because of the insufficiency of the evidence to support the allegations and prayer of the petitions. Without going into the detail of the reasons raised by the motions, the board is of the opinion that the motions should be reserved to the end of the case and should not be considered until after all parties have had an opportunity to present their evidence.

Speaking on the request to adjourn the case three months, the board pointed out that the petitions of the companies were filed on Dec. 14 and they were brought on for hearing on Jan. 19. Adjournment was then taken until Feb. 16. The board said:

> Under the circumstances the board feels that an adjournment to March 21 should allow ample time for the counsel of the municipalities to obtain the necessary data for the preparation of their case.

News Notes

Eight Cents in Sioux City.—Fares on the lines of the Sioux City Service, Sioux City, Iowa, will be 8 cents cash or two tickets for 15 cents after March 1. The present rate is 7 cents cash or four tokens for 25 cents. Diminishing revenue since 1921 forced the change, according to W. J. Bertke, general manager. Competition of the automobile is blamed by the railway officials for the falling off in passenger revenue.

Would Bar One-Man Cars.—About 1,500 residents of Norwood, Ala., have requested the immediate removal of one-man cars from the Norwood line and intimated that refusal to remove the pay-as-you-enter cars would mean a demand for return of the jitneys. This was the message in two petitions presented recently to City Commission.

Amplifiers in Montreal Cars.—The Montreal Tramways, Montreal, Que., has decided to install amplifiers in its cars to enable passengers to hear street names as they are announced by trainmen. Difficulty arose when the one-man cars were placed in operation for the motorman has to announce street names with his back to the passengers, and it has been practically impossible to hear him. The device will be placed in front of the operators of the cars, who will speak into it in an ordinary tone which will be audible to every passenger in the car.

No Change Expected in Transfer Charge.—Following a recent hearing, attended by representatives of the Indianapolis Street Railway, before Clyde H. Jones, member of the Indiana Public Service Commission, it was learned there was little likelihood that the commission would alter an order of more than a year ago in which the transfer fee was fixed at 2 cents. The order for the increase from 1 to 2 cents was for a year, ending Jan. 1. It was continued at that time pending a hearing.

Survey Under Way. — The town of Irvington, N. J., is making a survey of its bus and electric railway transportation with especial respect to their coordination and to the plan for re-zoning recently submitted by the Public Service Transportation Company, a subsidiary of the Public Service Railway. To conduct the survey, the town has employed Fisk & Roberts, consulting engineers, New York.

Group Insurance for Employees.—The St. Louis & Hannibal Railway, Quincy, Ill., has adopted a group program providing the working personnel with approximately $80,000 of life insurance, sick and non-occupational accident benefits and the advantages of a visiting nurse service. The insurance plan, underwritten by the Metropolitan Life Insurance Company, is co-operative, with the employer and employees sharing the cost through joint contribution toward the payment of premiums. Employees in the main group covered each receive $1,000 of life insurance. Sick and accident benefits, based on weekly earnings, average about $10 a week. Included in the group contract is a clause which guarantees payment of the full amount of an employee's life insurance to him, if he becomes totally and permanently disabled before age 60.

Foreign News

Swiss Railroad Electrification

Traffic on the Swiss Federal Railroads has been slowly declining. This has been accompanied by a falling off in the receipts, the effect of which has extended to the railroad authorities' plans for further developments. The budget for 1927 provides a sum of only $17,600,000 for new extension work as compared with $21,400,000 in 1926. As in recent years, the bulk of the money, about $11,000,000, is to be utilized for further electrification work. During the coming year this will be mainly centered in eastern Switzerland.

Among the lines in this district which are in progress of electrification or scheduled for electrification are the Richterswil-Sargan-Chur, Sargans-Buchs, Winterthur - Romanshorn - Rorschach and Winterthur - St. Gall-Rorschach routes. The budget also includes a large sum for the extension of the power generation plants; thus $800,000 is allocated to the extension of the Vernayaz hydro-electric station and $1,400,000 to the construction of additional transformer stations. The budget provision for new rolling stock for the electrified railroad shows a considerable diminution compared to previous years, but a sum of $4,400,000 is allowed for expenditure in this direction next year.

New Hydro-Electric Station to Give Power to Brenner Line

Electric trains probably will be running over the Italian and Austrian sections of the Brenner line by next year if the hydro-electric station now under construction is completed in time. This station is located in the mountains about 3 miles from the railway depot of Innsbruck. Power available will amount to about 100,000,000 kw.-hr. a year. All power produced over and above that required for railway operation and for the zinc mines of Schneeberg, as arranged between the Societa Generale Electrica Tridentina and another Italian company, will go to feed the system of the first-named company.

Polish Electrification Plan Progresses

Government and representatives of European and American utilities corporations are reported to have agreed upon the main points of the electrification project for Poland, involving an outlay of £5,000,000. The financing is to be guaranteed, it is said, by the Polish State National Economy Bank. The machinery required is to be imported from the United States.

Glasgow's New Fares Successful

Graded fares in Glasgow, Scotland, of 1 penny, 1½ pennies, 2d., the latter being the maximum rate for any distance, are proving successful from the point of view of revenue. This new scale has been in operation since last summer. There has been a decided increase in comparison with the receipts shown during a corresponding period the year before, while there was a large decrease in the revenue from shorter journeys. This was more than counterbalanced by the increase from the 2d. fares.

Liverpool Report Praises Trams

Belief in the tramcar as the best vehicle for handling heavy traffic was emphasized in the report of P. Priestly, general manager tramways department, recently submitted to the Liverpool Council, and accepted. Buses have their sphere of usefulness as feeders on routes where the traffic does not warrant the expenditure necessary to undertake tramway operation. If buses were to replace trams in Liverpool, it would require about 50 per cent more vehicles. This, in turn, would result in a bigger mileage and increased cost. Moreover, the additional vehicles would cause serious congestion.

In reply to a recent suggestion to "scrap the trams," the report went on to say that the Liverpool undertaking had a capital of nearly $3,000,000 and payments for sinking fund and interest would have to be made from the bus revenue. In addition, there would have to be new capital expenditure on the purchase of buses and this would have to be repaid in seven to ten years, as against fifteen to twenty years for a tramcar. The tramway system paid approximately £45,000 per annum in taxes, and in addition £50,000 toward road maintenance. If the trams were scrapped the latter would have to be paid out of taxes, so that a total of £95,000, equal to nearly 4d. per £1, would have to be met out of general taxation instead of being paid by the tramway as at present.

Accidents caused by electric railway cars in the past year were fewer per mile than for any other passenger vehicle, the report stated. In foggy weather tram service can be run when all motor vehicles are brought to a standstill.

Floor Signs Used to Direct Passengers.—Traffic direction signs are being tried by the London Underground at the Charing Cross station. There are two types in use, one composed of aluminum letters inlaid in rubber and the other having illuminated glass letters. They are set into floors of passages to direct passengers.

Trolley Line Proposed for Kavala, Greece.—Influx of refugees to the city of Kavala has so greatly increased the population of that city that despite the narrow streets the proposal is being considered to build a single-track trolley line. The present population of 80,000 people is now transported almost entirely by taxicabs.

Recent Bus Developments

Another Respite in New York Bus Wrangle

No action was taken by the Board of Estimate, New York City, N. Y., at the meeting on Feb. 24 toward approving the franchise contracts on bus operation because of the plea of Deputy Comptroller Frank J. Prial, representing Comptroller Berry, that time was needed to study the proposed forms, which had just been submitted by the Board of Transportation. The matter went over for a week. This made it necessary to abandon the date, March 22, fixed by a resolution for the statutory public hearing on the contracts as the law requires the advertising of these contracts for 27 days. It was decided to fix a new date for a vote at the subsequent meeting.

Toledo Bus Ordinance Being Prepared

Toledo, Ohio, has been without any bus regulatory legislation for nearly two years and in response to a public demand in recent weeks following a severe accident a comprehensive bus ordinance was prepared by city legal authorities. It was referred by the Council to the street railway board of control.

After study the board has stated that there was great need for protection of the public and regulations regarding equipment, safety and insurance; that nothing should be written into the ordinance which would embarrass the city in its effort to work out a unified system of bus and street railway service at some later date under a single company, and that in event of passage such an ordinance should be strictly enforced with licenses granted only to lines which would not compete directly with the Community Traction Company. The Council has indicated that it will follow the proposals of the board of control in completing the ordinance.

Gary Line Prepares Site for 90-Bus Garage

The Shore Line Motor Coach Company, a subsidiary of the Gary Railways and the Chicago, South Shore & South Bend Railroad, recently announced the purchase of a site for a large modern garage in the city of Hammond, Ind., to be built and ready for occupancy by June 1 of this year.

The garage will have storage space for about 90 motor coaches and will contain a machine shop and an overhauling department where coaches will be repaired. The cost of this improvement, including the land purchased, will be approximately $150,000.

Merger of the Calumet Motor Coach Company, which formerly operated ten local bus routes in Hammond and adjacent communities, into the Shore Line Motor Coach Company was approved by the Indiana Public Service Commission last month, making the latter company one of the largest operators of motor coaches in the Middle West. Of the total of 132 motor coaches now owned by the Shore Line Motor Coach Company, 83 operate out of the city of Hammond.

Eastern Massachusetts Receives Part Fare from Bus Company

The Public Utilities Commission of Massachusetts has granted authority to the New England Transportation Company, the bus subsidiary of the New York, New Haven & Hartford Railroad, to operate buses on the Boston-Providence route alternately operating through the towns of Walpole and Norwood in Massachusetts. The route thus covered by the bus company encroaches upon territory served by the Eastern Massachusetts Street Railway. An agreement between the two companies provides for the payment of 18 cents to the Eastern Massachusetts Street Railway for each passenger between East Walpole and Boston and between Boston and East Walpole. This agreement was not favorable to the commission. The commission says:

> However unjustifiable and unwarranted the payment to the street railway of a portion of the fare received by the transportation company may be, it does not affect the question which presents itself on this petition. The sole issue before us is whether public convenience and necessity require the operation of motor vehicles over the proposed route.

This the commission believed necessary. It did, however, say:

> In the operation of buses over the proposed route, the electric railway will not do anything to entitle it to compensation. The consideration of this payment, apparently, is in the electric railway refraining from objecting to the issuance of a certificate of public convenience and necessity.
>
> We are of the opinion that expenditures of money of a public utility is unjustifiable. If the question of the reasonableness of the rate charged by the transportation company were now before us, we would without question disallow, as an item of expense, these payments to the electric railway.
>
> However unwarranted and unjustifiable the payment to the electric railway of a portion of the fare received by the transportation company may be, it does not affect the question which presents itself on this petition. The sole issue before us is whether public convenience and necessity require the operation of motor vehicles over the proposed route. We think they do.
>
> The certificate of public convenience and necessity heretofore granted by the department on April 30, 1926, to the New England Transportation Company for the operation of buses for the carriage of passengers for hire between Attleboro and Boston is hereby amended to the following extent:
>
> Said petitioner shall be permitted to operate such buses over the following alternative route through the towns of Walpole and Norwood; from Walpole Square over Main Street, East Street, Short Street, Washington Street to the junction of Washington Street and Walpole Street in Norwood. And on said alternative route shall be permitted to make a stop in the town of East Walpole at or near the post office to take on passengers for Boston, or to let off passengers taken on at Boston.
>
> Provided, however, that no local passengers shall be accepted at any intermediate point between any stopping place in East Walpole and any point in Norwood, and provided, further, that any other restrictions in the original certificate shall remain in force.

De Luxe Service Between Newark and Hackensack

De luxe express bus service was started between Newark and Hackensack, N. J., on Feb. 13, when the Public Service Transportation Company started the operation of a line of "parlor car" buses between the two municipalities. This is the first line of the kind to be put in operation in that section of the state.

Under the schedule adopted the first bus leaves Hackensack at 7 a.m. and Newark at 8 a.m. and the last bus leaves Hackensack at 11 p.m. and Newark at 12 midnight and buses leave both terminals on the hour and half hour during the intervals between.

The through fare between Newark and Hackensack is 50 cents. The minimum fare northbound is 25 cents, good for a ride from any point in Newark to the north line of Lyndhurst. The minimum fare southbound is 10 cents, good for a ride from any point in Hackensack to Williams Street and Terrace Avenue, Hasbrouck Heights. The running time of buses between Newark and Hackensack is 50 minutes.

Service Between New Haven and Guilford to Be Resumed

Bus operation by the New Haven & Shore Line Railway between Guilford and New Haven, Conn., was resumed on Feb. 9, following a suspension of a month. It was noted recently that the bill presented in the Legislature by Representative Harry R. Durant, Guilford, would be withdrawn. This bill asked that the charter granted the New Haven & Shore Line be repealed.

William Walker, manager of the New Haven & Shore Line Railway, in making the announcement regarding bus service stated that the people had demanded this type of transportation. It was brought out that the territory between Branford and New Haven also would be served by the cars of the Connecticut Company, but that the 8 miles between Guilford and Branford was too thinly populated to net much revenue.

Representative Durant had previously branded the company's suspension of the bus line as outrageous and something that should not be tolerated. He scored the argument of the Shore Line that it could not make any money with buses on that line in the winter. It was his belief that the railway had to take the bitter along with the sweet, exactly like other public service corporations in Connecticut.

Bus Losses Concern Cincinnati

Increasing losses on several of the coach routes of the Cincinnati Street Railway, Cincinnati, Ohio, have caused the public and city officials much concern, due to the fact that under the "service-at-cost" franchise the loss is made up by the return from railway fares.

These losses are not regarded by the management as being of an alarming nature, but because the situation is looked upon by the public as serious, the management and the city are studying the problem with the view of making the operation of these routes less costly and more profitable.

Walter A. Draper, president of the railway, has prepared an analysis of the situation showing how to reduce the losses. This he is now submitting to Edgar Dow Gilman, Director of Public Utilities, for his consideration and approval.

Permits in Minneapolis

Permits to operate buses on East River Road have been granted by the Park Board at Minneapolis, Minn., to the Northland Transportation Company and the Jefferson Highway Transportation Company. These companies operate also on River Road in St. Paul on a through intercity route, without picking up passengers, and have been doing so for some time, between the Franklin Avenue and Lake Street bridges over the Mississippi River.

This decision will have a bearing on the Terminal Motor Bus Company, which has applied to the Minnesota Railroad and Warehouse Commission for permission to operate bus service between St. Paul and Minneapolis. At present three intercity bus lines are operating, all owned by the Twin City Motor Bus Company, a subsidiary of the Twin City Rapid Transit Company.

It is contended by C. G. Calderwood, the company's president, that residents of the midway district of St. Paul have for years felt the need of more direct transportation facilities, especially for students at the University of Minnesota in Minneapolis.

The Terminal Motor Bus Company is five years old. It operates out of St. Paul to St. Paul Park and to Prescott, Wis., and Durand, Wis., also chartered buses to various points in the United States and Canada. It will install on the new line 26-passenger coaches with parlor seats, heated by hot water. The same fare as other lines will be charged, or 25 cents a trip, but in addition the company proposes a 20-cent commutation ticket rate.

On the other hand the Park Board, Minneapolis, Minn., has granted permission for the Twin City Motor Bus Company to operate a bus line on Cedar Lake Boulevard, supplying service to a district now without transportation of the sort. The route is from the end of the Bryn Mawr car line on Cedar Lake Road, Superior Boulevard, Twenty-second Street and Cedar Lake Boulevard.

The ordinance passed by the Minneapolis Park Board on Nov. 3, 1926, permitting bus companies to operate on parkways and through parks upon payment to a minimum fee of $10 and a maximum of 20 per cent of the state motor vehicle tax for each bus, has been attacked in the district court in a suit by A. S. Dowdall, through Attorney F. W. Booth. The fee money is utilized to maintain and improve city parkways. Default in payment of a bus fee may result in a fine of from $5 to $1,000. It is sought to have the ordinance nullified on the complaint that the ordinance is a public menace and that the rights the board extends to commercial transportation companies are beyond the powers and contrary to the traditions of the Park Board.

Denver Tramway Gets Bus Permit.—The Bus Transportation Company, a subsidiary of the Denver Tramway, Denver, Col., was given a permit on Feb. 16 to operate buses from Englewood, Fort Logan and Loretto Heights Academy. This service is a substitute for the former electric railway, abandoned because it did not pay.

Buses May Replace Cars.—The Yakima Valley Transportation Company, North Yakima, Wash., will probably replace its last street cars with buses as soon as a line of paving is completed along half a mile of streets which the city and county are doing jointly. The two buses now operated on the Yakima streets are said to be very satisfactory.

New Line Starts. — Operation of a bus line between Philadelphia and Doylestown, Pa., was started on Feb. 6 by the Philadelphia Rural Transit Company, a subsidiary of the Philadelphia Rapid Transit Company. The buses, which run in conjunction with railway service, pass over Old York Road from City Line to Willow Grove and over the Easton Highway from Willow Grove to Doylestown.

Buses Replace Cars.—Permission has been given by the Board of Public Utility Commissioners of New Jersey for the suspension of service on the Sixth and Eighth Streets lines of the Public Service Railway, in Camden, N. J. The board at the same time approved of operation of eleven buses by the Public Service Transportation Company, a railway subsidiary, on the Mount Ephraim route, between Camden and Woodlynne, N. J. The buses will replace the suspended railway service.

Would Operate on White Plains Route.—The Westchester Street Transportation Company, Inc., on Feb. 23 filed petition with the Public Service Commission for an order authorizing the operation of buses on a portion of its route in White Plains. The petition is filed under the provisions of Section 50-A of the Public service commission law. This company is a subsidiary of the Third Avenue Railway System of New York City. It proposes to substitute buses for street cars over a route beginning at the tracks of the New York Central Railroad on Main Street, in White Plains, to the city line and the town of Harrison. A public hearing will be held on this application.

Bus Request Refused.—The Public Service Commission recently dismissed the petition of the Rochester Interurban Bus Company, Inc., for permission to operate bus lines from Rochester, N. Y., to Manitou Beach, Grand View Beach and Island Cottage. Petition for these bus routes was filed on July 24, 1925. Subsequently, the company advised the commission it proposed to have these routes operated by the Rochester Railways Co-Ordinated Bus Lines, Inc., and asked that decision be withheld. Both of these bus companies are owned by the New York State Railways. In January, 1927, the Rochester Railways Co-Ordinated Bus Lines, Inc., filed a petition for these routes and hearing has been held on this petition also. The company agrees that the first petition be refused and the proceeding on the application be closed.

Financial and Corporate

International Claims 10-Cent Fare on Commission Valuation

In a formal statement filed with the Public Service Commission the International Railway, Buffalo, N. Y., asserts that a 10-cent fare would do no more than provide the additional revenue required by the company on the commission's own showing. A Public Service Commission accountant recently reported that the company was earning a fair return, assuming a rate base of approximately $20,000,000, whereas the commission has alowed a rate base of $23,000,000, two of the five members holding that it should be $32,000,000.

On the basis of the commission's own valuation, which is one-third that claimed by the company, I.R.C. fails by $460,000 to earn the return to which it is entitled, says the company's statement.

Decreased employment on the Niagara frontier causes a loss of riding, so that the additional revenue required to give the company a legal return would make a 10-cent fare necessary.

The company's statement alleges many errors in the report of the accountant for the Public Service Commission. It points out that while the subsidiary company, International Bus Corporation, pays International Railway $1,000 a month as rent for Walden Avenue carhouse, and the commission accountant included the rent in income, he deducted a sum set as the value of Walden Avenue carhouse from the rate base. Many items of smaller amount were rejected because the necessity for the expense arose in a previous period. More than $60,000 was deducted covering payment for actual service rendered and expenses incurred.

An item of $10,551 expenses in connection with the investigation of the dynamiting of the high-speed train in 1922 was also deducted by the commission's accountant. The company's statement says:

> There can be no justification for these deductions unless the commission takes the view that the collection and preparation of evidence against lawbreakers attaching the company's property and its patrons is beyond the scope of the company's duty.

Balance Increased on Detroit System

The total operating revenue of the Department of Street Railways at Detroit, Mich., for the year ended Jan. 31, 1927, was $24,713,591, against $23,485,313 for the year ended Jan. 31, 1926. In these figures are included a railway operating revenue and a coach operating revenue of $22,411,611 and $2,301,979, in the 1927 period respectively, against $22,556,758 and $928,554 in 1926. The total revenue from all sources was $24,985,481, against $23,680,745 for the year ended Jan. 31, 1926. Total operating expenses were $19,119,770 in 1927. Of this amount $16,931,548 was for railway expenses and the remainder for coach expenses. The total operating expense for the 1926 period was $17,644,205. Of this amount $16,746,622 was for railway operation and $897,583 for coach operation. Net revenue from all sources totaled $5,865,711 in 1927, against $6,036,539 in 1926. Following the consideration of interest and other deductions a net income of $3,183,299 remained, against $3,389,536 in 1926. The balance for the period was $583,001 in the 1927 period and $570,940 for the year ended Jan. 1, 1926. The railway passengers totaled 481,011,056, against 484,509,830 for the 1926 period. Total coach passengers numbered 29,096,028, against 12,388,021 for the 1926 period. Railway revenue car-miles amounted to 52,419,362, against 53,463,391 and coach revenue coach-miles were 9,410,300, against 4,028,384 for the year ended Jan. 31, 1926.

Fonda Road Protests $1,442,130 Condemnation Figure

Work on the dam to be built in the Sacandaga River at Conklingville, N. Y., will be started within a month, Edward H. Sargent, engineer of the Hudson River regulating board, said on Feb. 21. This is in spite of the intention of the Fonda, Johnstown & Gloversville Railroad to appeal an award of $1,442,130 made on Feb. 19 by a condemnation commission for 7 miles of the railroad's right-of-way along the Sacandaga River near Sacandaga Park.

William J. Maider, acting as attorney for the railroad company, said if the award is confirmed by the court the company will appeal. The railroad company put in a claim for more than $4,000,000.

Within the month the board probably will advertise for bids for relocating the highways and for the big dam itself. The dam will impound 32,000,000 gal. of water and the land will be inundated a distance of 30 miles in length by 3 miles in width.

Income Balance Higher

Washington Company Earns Less than 4 Per Cent on Property Value—Decline of 1 Per Cent in Passenger Traffic

FOR the year ended Dec. 31, 1926, the balance of income credited to profit and loss of the Washington Railway & Electric Company, Washington, D. C., was $773,200, compared with $644,857 for the preceding year. This fact was disclosed in the annual report of President William F. Ham submitted to the stockholders at the annual meeting on Jan. 15, 1927.

During the year the company's system carried 76,797,163 revenue passengers and 24,272,542 transfer passengers, or a total of 101,069,705 passengers. This is a decrease of 708,473 in the number of revenue passengers carried compared with the previous year, or slightly less than 1 per cent. The primary cause of this continuous loss in traffic is the increase in use of privately owned automobiles, the total now registered in the District of Columbia being 131,362, or 12.6 per cent more than those registered in 1925.

COMPARATIVE STATEMENT OF WASHINGTON RAILWAY & ELECTRIC COMPANY

	1926	1925
Gross earnings from operation	$5,012,619	$4,775,285
Miscellaneous income (including dividends from Potomac Electric Power Company)	1,149,113	1,025,501
Gross income	$6,161,733	$5,800,786
Operating expenses (including depreciation), taxes and miscellaneous charges	4,140,222	3,915,959
Interest on funded and unfunded debt	688,151	730,600
Payment of dividend on 5 per cent preferred stock	425,000	425,000
Payment of dividend on common stock (5 per cent)	325,000	325,000
	$5,578,374	$5,396,559
Balance of income for year 1926 credited to profit and loss	583,358	404,227
Miscellaneous items credited to profit and loss	189,841	240,630
Total credited to profit and loss during the year	$773,200	$644,857

The rate of fare in effect on the street cars during 1926 was the same as that in effect since the spring of 1922—that is, 8 cents cash or tickets sold at the rate of six for 40 cents. Notwithstanding considerable improvement being effected in 1926 in all the operating departments of the railway, the results for the year show a return of less than 4 per cent on the value of the property within the District of Columbia as determined by the Public Utilities Commission.

In spite of this the policy of liberal expenditures for maintenance and reconstruction of way and structures was continued in 1926. The amount expended for general maintenance of track and roadway, together with allowances for depreciation, was $904,511. The more important reconstruction projects completed during the year included the rebuilding of 8,175 ft. of underground conduit track and 21,905 ft. of overhead trolley track, at a cost of approximately $312,156. In the summer of 1926 the company placed in operation fifteen modern up-to-date cars, with automatic rear-exit doors and leather-covered de luxe seats. The amount expended for the cars was $235,000, or approximately $15,700 per car. Fifteen new buses were purchased during the year, all of the Yellow Coach type, one with a seating capacity of 21 and the rest with a seating capacity of 29 each, at a total cost of approximately $125,000. These additional buses acquired now bring the fleet to

57 buses, operating over routes with an aggregate mileage of 54.9, representing an investment of $378,938 and all operating as auxiliaries to the railway lines.

The direct cost of operation of buses since they were started in May, 1922, has been $175,916 in excess of the receipts, but the results for the year 1926 are somewhat more encouraging, President Ham said, than at any time since the company entered the field of this form of transportation.

There was a slight increase in the number of accidents compared to 1925 due to added congestion on the streets. Seventy-five per cent of the accidents in 1926 were with automobiles. Aside from the constant alertness of the supervising forces and the operators themselves to guard against accidents, quarterly "Safety" meetings are held throughout the year, where the subject of safe operations is discussed at length. These efforts are productive of results, as demonstrated by the fact that the expenditure for settlements of claims in 1926 was a little more than 3 per cent of the total operating revenues. This is not quite so good a showing as in 1925, but when considering the increase in vehicular movements in 1926 it indicates a degree of co-operation on the part of the employees of the operating departments that is worthy of mention and praise.

The total outstanding bonded indebtedness of the Washington Railway & Electric Company and subsidiary companies, including the Potomac Electric Power Company, is now $25,906,900. This amount, added to the $15,000,000 capital stock of the parent company, and $2,002,850 outstanding capital stock of the subsidiary companies, makes the total outstanding capitalization at this time $42,909,750. This excludes bonds purchased for the sinking funds and for temporary investments.

STATEMENT OF PASSENGERS CARRIED BY WASHINGTON RAILWAY & ELECTRIC COMPANY

	Revenue Passengers Carried	Decrease Compared with Previous Year
1919	91,488,735	
1920	87,782,784	3,705,951
1921	85,481,656	2,301,128
1922	82,716,756	2,764,900
1923	81,518,607	1,198,149
1924	77,786,675	3,731,932
1925	77,505,636	281,039
1926	76,797,163	708,473

The total payroll for the year 1926 of the Washington Railway & Electric Company and subsidiary companies, including the Potomac Electric Power Company, was $4,794,140, an increase over that of the previous year of $135,112.

The number of employees in the service of the entire system is now 2,943, of whom 2,114 are members of the Washington Railway Relief Association.

Valuation Case to Be Appealed by Washington Company

The United States Supreme Court will be asked to pass on the authority of the Court of Appeals in deducting $5,150,000 from the figures representing the valuation of the properties of the Capital Traction Company, Washington, D. C.

The appellate tribunal was asked on Feb. 17 by Attorney George E. Hamilton and G. Thomas Dunlop to stay its mandate long enough for the company to apply to the highest court for a writ of review. A request of this sort is usually granted, especially when important questions and large figures are involved.

On Feb. 7 the Appellate Court fixed the value of the company's properties, for rate-making purposes at $25,756,880, or the sum of $5,150,000 less than the figure arrived at by the lower court. The sum of $5,150,000 was added by the lower court as the amount representing the cost of the franchise and good will of the old Washington & Georgetown Railroad in 1895. This road, when merged with the old Rock Creek line, became the present Capital Traction Company.

Conspectus of Indexes for February, 1927

Compiled for Publication in This Paper by
ALBERT S. RICHEY
Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	Feb. 1927 **7.45**	Jan. 1927 **7.42**	Feb. 1926 **7.35**	Feb. 1927 **7.45**	May 1923 **6.88**
Electric Railway Materials* 1913 = 100	Feb. 1927 **154.0**	Jan. 1927 **156.6**	Feb. 1926 **155.3**	Sept. 1920 **247.5**	Oct. 1924 **148.5**
Electric Railway Wages* 1913 = 100	Feb. 1927 **226.7**	Jan. 1927 **226.6**	Feb. 1926 **223.8**	Sept. 1920 **232**	Mar. 1923 **206.8**
Am. Elec. Ry. Assn. Construction Cost (Elec. Ry.) 1913 = 100	Feb. 1927 **202.9**	Jan. 1927 **203.5**	Feb. 1926 **201.9**	July 1920 **256.4**	May 1922 **167.4**
Eng. News-Record Construction Cost (General) 1913 = 100	Feb. 1927 **210.2**	Jan. 1927 **211.5**	Feb. 1926 **206.6**	June 1920 **273.8**	Mar. 1922 **162.0**
U. S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Jan. 1927 **146.9**	Dec. 1926 **147.2**	Jan. 1926 **156.0**	May 1920 **246.7**	Jan. 1922 **138.3**
Bradstreet Wholesale Commodities 1913 = 9.21	Feb. 1 1927 **12.52**	Jan. 1 1927 **12.82**	Feb. 1 1926 **13.72**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
U. S. Bur. Lab. Stat. Retail Food 1913 = 100	Jan. 1927 **155.3**	Dec. 1926 **161.8**	Jan. 1926 **164.3**	July 1920 **219.2**	Mar. 1922 **138.7**
Nat. Ind. Conf. Bd. Cost of Living 1914 = 100	Jan. 1927 **165.9**	Dec. 1926 **168.6**	Jan. 1926 **170.4**	July 1920 **204.5**	Aug. 1922 **154.5**
Steel Unfilled Orders (Million Tons) 1913 = 5.91	Jan. 31 1927 **3.800**	Dec. 31 1926 **3.961**	Jan. 31 1926 **4.883**	July 31 1920 **11.118**	July 31 1924 **3.187**
Bank Clearings Outside N. Y. City (Billions)	Jan. 1927 **18.89**	Dec. 1926 **19.76**	Jan. 1926 **19.79**	Oct. 1925 **20.47**	Feb. 1922 **16.65**
Business Failures Number Liabilities (Millions)	Jan. 1927 **2227** **75.06**	Dec. 1926 **1979** **91.88**	Jan. 1926 **2053** **52.36**	Jan. 1924 **2231** **122.95**	Aug. 1925 **1353** **27.22**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 137 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

Refinancing of Dayton & Western Completed

Refinancing of the Dayton & Western Traction Company, handed back to its original owners when there was a dissolution of the merged Ohio Electric System, has just been completed by stockholders. This includes the payment of outstanding obligations through the issuance of $312,500 in coupon bonds, bearing 5 per cent interest. The Winters National Bank is made trustee. A first mortgage on the property and all equipment, along with a deed of trust, was filed by President Valentine Winters.

International Railway Reports Small Net Income

The yearly income account of the International Railway, Buffalo, N. Y., shows a net income of $48,610 for 1926, compared with a deficit of $210,355 for the year 1925. This is the first time in nine years that the company's receipts have exceeded expenses. For nine years no dividends have been paid to stockholders, who, according to President Bernard J. Yungbluth, have contributed in cash during this period for the maintenance of service $4,140,445. During the same period more than $5,000,000 has been paid to the various municipalities served by the company.

INCOME ACCOUNT OF INTERNATIONAL RAILWAY

	1926	1925
Operating revenue.........	$10,650,372	$10,695,695
Operation and taxes.......	9,193,277	9,408,102
Operating income.........	$1,457,095	$1,287,593
Non-operating income......	49,799	48,094
Gross income...........	$1,506,894	$1,335,687
Income deductions.........	1,458,284	1,546,042
Net income.............	$48,610	*$210,355

*Indicates deficit.

The company is now faced with demands for track and paving reconstruction in each of the municipalities served, totaling in Buffalo alone more than $2,000,000. This paving is within the tracks and 2 ft. outside, and constitutes 55 per cent of the total width of the street. The railway has contended that this cost is the result of antiquated laws, making the car rider responsible for paving, notwithstanding the fact that street cars are the only vehicles on the streets that do not use the paving.

Applications for higher fares to meet these costs and to provide the legal return to stockholders are now pending before the Public Service Commission and the federal courts.

The accompanying statement shows the results of 1926 compared with 1925.

$2,500,000 of Notes of Baltimore Company Offered

The United Railways & Electric Company, Baltimore, Md., has sold to Alexander Brown & Sons $2,500,000 of three-year notes of the company. They are to be dated March 1, 1927, due March 1, 1930, and bear 6 per cent interest. They were offered on Feb. 23 to banks and other investors at 99¼ and interest to yield about 6.28 per cent. The Safe Deposit & Trust Company of Baltimore is trustee. Proceeds of the sale are to be used to refund company notes which mature on Aug. 1, 1927, and preference in allotments on subscription to the notes now offered will be given to those who agree before the subscription books are closed to make payments for the new notes with the old notes at par and interest.

Directors Elected at Worcester—New Cars and More Buses

Seven new directors were added to the board and two of the old board resigned at the annual organization meeting of the Worcester Consolidated Street Railway, Worcester, Mass., on Feb. 23, the first meeting since the New York, New Haven & Hartford Railroad resumed ownership of the property. Henry C. Page, general manager, and Leverett Candee, treasurer, resigned as directors. Arthur P. Russell, one of the new directors and a vice-president of the New Haven, was elected vice-president to fill the vacancy caused by the death a few months ago of Col. George Bullock.

The new directors are: John E. White, president of the Worcester Bank & Trust Company and president of the Worcester Chamber of Commerce; Forrest W. Taylor, T. Hovey Gage and Harry W. Goddard, all of Worcester; E. G. Pearson, president of the New Haven; E. G. Buckland, vice-president of the New Haven, and Mr. Russell. The following directors were re-elected: Charles M. Rogerson and W. E. McGregor, Boston; Charles E. Ware, Fitchburg; Clark V. Wood, Springfield; Francis H. Dewey, Worcester.

The officers of the corporation are: President, Clark V. Wood; vice-president, Arthur P. Russell; secretary, William F. Crowe; chairman, Francis H. Dewey.

President Wood, in discussing plans for the future of the road under the management of the New York, New Haven & Hartford Railroad, said recently:

> I believe that when the new cars are placed in service the patronage on all the lines will be increased and that the losses noted during 1926 will not be so large this year. We plan to increase the number of buses. This will lessen our operating expenses. Our profits in 1927 should be larger than in 1926.

Mr. Wood stated that plans for new cars were in the hands of officials of the railroad and that bids will be requested soon. The number of buses also will be increased. Several electric lines will be discontinued in favor of bus service. Mr. Wood said there were several lines in Worcester which could be taken care of by buses. There may also be many changes in schedules to serve the patrons better.

As further evidence that the rehabilitation program is already being followed, Mr. Wood stated that plans are being drawn by the Henry R. Kent Company, Rutherford, N. J., for a new carhouse and for a garage for the buses which the company operates. Many of the cars now being operated will be overhauled and others, in service a long time, will be junked.

Abandonment of Mesaba Railway Sought

Hearing on a petition for permission to abandon operation of the Mesaba Railway, Virginia, Minn., was set to take place in district federal court at Duluth on Feb. 23, under an order signed by Federal Judge John B. Sanborn and made public on Feb. 14 by James C. Chestnut, a receiver of the railway.

The petition, seeking authority to abandon the operation of the line and to dismantle and dispose of the property, was made by Mr. Chestnut and Oscar Mitchell, receivers. The line has been operating at a loss for a number of years, according to the receivers. If authority is granted, the line will probably be abandoned about April 19. The company operates 40 miles of line.

Denver & Interurban Railway Sold

The Denver & Interurban Railway, Denver, Col., which operates an electric railway from Denver to nearby northwestern points, was sold on Feb. 17 at auction by the federal court for $88,850. The road will be dismantled. The sale was at the instigation of the Guaranty Trust Company, New York, which is trustee under the first mortgage bonds for $1,078,000.

Increase In Net Income.—For the seven-month period ending Jan. 31, 1927, the total operating revenues of the Brooklyn-Manhattan Transit System, Brooklyn, N. Y., were $27,177,699, against $26,142,270 for the period ending Jan. 31, 1926. Total operating expenses increased from $17,008,778 to $17,525,563 in 1927. Following the consideration of income deductions there was a net income of $3,752,623 for the seven-month period ended Jan. 31, 1927, against $3,378,057 for the same period of the year previous.

Loss in Schenectady Larger.—The Schenectady Railway, Schenectady, N. Y., reports to the New York State Public Service Commission for the quarter ended Dec. 31, 1926, a net loss of $291,397 after fixed charges, compared with a net loss of $10,851 in the corresponding period of 1925.

New Directors Named in St. Louis.—Two new directors for the United Railways, St. Louis, Mo., were named at the annual meeting of the stockholders on Feb. 8. Walter W. Smith, vice-president of the First National Bank in St. Louis, and Herman C. Stifel, broker, replaced A. Siegel, who died recently, and A. C. Brown, who declined re-election.

Net Corporate Income Lower.—For the six months period ended Dec. 31, 1926, the passenger revenue on the Brooklyn City Railroad, Brooklyn, N. Y., was $5,677,845, against $5,688,734 for a similar period the year previous. Operating expenses and taxes increased from $4,852,726 to $4,900,749 in 1926. After the consideration of income deductions there was a net corporate income of $624,466 for the 1926 period, against $721,516 for the period ended Dec. 31, 1925.

Would Increase Stock Shares.—The Indiana Service Corporation, Fort Wayne, Ind., in a petition just filed with the Indiana Public Service Commission, has asked to increase by 30,500 the number of shares of its preferred stock and by 200,000 the common stock shares in order to reimburse the company for betterments and extensions for 1926 and those planned for 1927. The petition states that the present authorized stock is 40,000 shares of preferred with a par value of $100 and 500,000 shares of common.

Discontinuance Threatened. — Employees of the Peterboro Radial Railway, Peterboro, Ont., Canada, have been notified that the service may be discontinued after April 1. The notice from the management, the Hydro-Electric Power Commission, was posted in the power house. It is said that the intimation of the possible abandonment of the system is the result of higher power rates in Central Ontario.

Lease Extended.—The Capital Traction Company, Washington, D. C., on Feb. 18 announced it had extended for six months its lease with the Washington-Maryland Railroad on the latter corporation's line from Fourteenth and Kennedy Streets northwest to Takoma Park, Md. Negotiations are pending for purchase of the line by the Capital Traction Company, but there has been disagreement over the terms of transfer. The present lease expired on Feb. 20 and the extension is for the purpose of permitting further negotiations.

Will Hear Abandonment Plea.—Hearing on the application of the Lake Shore Electric Railway to abandon its line between Sandusky and Norwalk, Ohio, will be held on March 3, before the Public Utilities Commission of Ohio. The railway points out that there was a decrease in receipts from $65,045 in 1920 to $17,616 the first eight months of 1926. During the entire time the expenses have exceeded the gross revenue. The deficit of this division from Jan. 1, 1920, to Aug. 31, 1926, is placed at $74,618. The company has paid $30,500 in taxes on this property. It points out that the territory covered by this division is not thickly populated, and that transportation needs will be fully cared for before the establishment of a bus line between Sandusky and Norwalk, as proposed by the Lake Shore Motor Coach Company, a subsidiary organized by the railway.

Personal Items

H. R. Whitney in Worcester

Operating Vice-President of Massachusetts Road Enters Upon His New Duties

Howard R. Whitney, recently named operating vice-president of the Worcester Consolidated Street Railway, Worcester, Mass., has begun his duties in that city and already a start has been made on the rehabilitation program planned for that road by the New York, New Haven & Hartford Railroad, which has again come into possession of the line.

Mr. Whitney has been associated with railroading, both steam and electric, for the past twenty years and his various connections have taken him all over the United States. Equipped with a mind that has shown ability to grapple with major problems, he has been called upon to supervise some of the most important transportation questions that have come up for consideration in various places.

Mr. Whitney is essentially an engineer, both by professional training and bent of talent and mind. He rejoices in working out problems that present obstacles. Quiet and unassuming, he studies his problems, finds the solution and then moves to put his ideas into effect. It is these qualities that have led to his consistent advancement in connection with the Springfield and the Worcester railways.

He became affiliated with electric railways in 1914 after he had accumulated a wealth of valuable engineering experience in the transportation field in the West. His first job with the electric railways operating in the cities of Worcester and Springfield was engineer of maintenance of way, and the thoroughness with which he did his work soon attracted the attention of his superiors. It was not long before his engineering responsibilities were increased. The augmented work acted as an incentive to spur him to greater effort and industry, and the reward in the form of an appointment as a special assistant to Clark V. Wood, the president, was the result. In this position, his ability to accomplish things and his talent for solving vexing problems came under official eyes in a more intimate way and he was made a vice-president of the railways.

Mr. Whitney got the railroad fever almost as soon as he had finished his college course in 1905. He was born in Boston, educated in the grammar schools and the English high school of that city and then entered Tufts College. He matriculated in 1905, returned to the college to teach mathematics for a time and then got his first chance in the field of endeavor which was to be his life work.

G. M. Thompson, a consulting engineer of Boston, much impressed with the enthusiasm and industry of young Whitney, employed him on various projects which his firm was handling. In this way Mr. Whitney had the good fortune to come under counsel and advice that was to stand him in good stead in his future railroading activities. He helped in surveying for a projected electric railway from Fitchburg, Mass., to Boston, Mass., and in working out plans for the elimination of grade crossings on the Boston, Revere Beach & Lynn Railroad and for the four-tracking of the road. Early in his career he virtually built the branch of the Lowell & Fitchburg Street Railway that runs from North Chelmsford to Westford.

The year 1907 found him with the Missouri Pacific engineering force in St. Louis as assistant on the engineering corps, a position which could not have been more humble. But here again his talents were manifest and in rapid order he passed through the various grades of assistant engineer, resident engineer on construction and acting division engineer. Finally he became acting division engineer of the important central division with headquarters in Van Buren, Ark.

H. R. Whitney

But the East called to Mr. Whitney. His home ties and his boyhood memories were in that part of the country and he returned to New England as resident engineer of the Grand Trunk Railway with headquarters in Woonsocket, R. I. From the Grand Trunk Mr. Whitney went to the Boston & Maine Railroad as assistant engineer and then as resident engineer. Then he ventured into business for himself, becoming actively affiliated with a contracting firm in Nashua, N. H., which handled many big engineering jobs in New England.

His affiliation with the electric railways at Springfield and Worcester followed and he has been connected with them since. He has an attractive personality and has the ability to make employees work with him. The manner in which he has begun his work in Worcester is typical of the man. He has shown a disposition to get at the bottom of things, to scrutinize conditions carefully and be fully informed before going ahead. Once he has gained the knowledge he desires there is no hesitancy in his decisions or determination. Mr. Whitney was not constrained to talk about his work, but he did consent to go on record to this effect:

> The big job of a public transportation company is to furnish adequate and satisfactory transportation, to satisfy the public as far as can reasonably be expected and profit from the good will which is bound to come from a public that knows you are trying to serve it.

Lachlan Mackinnon Succeeds Mr. Dalrymple

Lachlan Mackinnon, hitherto deputy manager of the Glasgow Corporation Tramways, Glasgow, Scotland, has been made general manager in succession to James Dalrymple, retired. He was selected by the corporation for the post by a vote of 54 to 23, following a recommendation by the tramway committee. No other name was suggested, but the minority, consisting largely of Socialists, contended that the vacancy should be advertised. Bailie Burt, chairman of tramways committee, pointed out that London was the only center in which the city could hope to find a man with tramway experience equal to that of Mr. Mackinnon. All other administrators capable of filling the position were associated with undertakings smaller than that of Glasgow. He was satisfied that Mr. Mackinnon was the best man the corporation could select, for he was admirably qualified by experience, personality and local knowledge to succeed Mr. Dalrymple.

Changes on Interstate Property

Charles D. Hardin, Seymour, Ind., who has been acting traffic manager for the Interstate Public Service Company, Indianapolis, Ind., since the death of Bert Weedon, several months ago, has been appointed to the position. Mr. Hardin has been connected with the company for a number of years.

L. D. Halstead, Louisville, Ky., has been appointed general agent for the Interstate Public Service Company to succeed C. D. Hardin. He has moved to Seymour, Ind., to take up his new work.

Harry Bullen of Detroit Resigns

Harry Bullen has resigned as general superintendent of the Detroit United Railway, Detroit, Mich., effective Feb. 1, after being with the company for nearly 40 years. At the time of his resignation he was the oldest officer of the company in point of length of service.

He started work in Detroit in 1888 following construction of the old Citizens' Company lines. His rise included promotions from dispatcher to assistant division superintendent, division superintendent, assistant general superintendent and general superintendent in turn. Since Jan. 1, 1904, he has been general superintendent of all the city and interurban properties of the Detroit United Railway.

Mr. Bullen was born in England in 1864, and when he was six years old his parents moved to Toronto, Ont. He was associated with Albert Stanley, now Lord Ashfield, head of the London underground system, when Lord Ashfield was connected with the Detroit United Railway and is a close personal friend of the head of the London system.

Mr. Bullen plans to divide his time between California and his cottage and hunting lodge in Michigan.

Changes in Title in Montreal

Alfred S. Byrd has had his title changed to superintendent, power department, Montreal Tramways, Montreal, Canada. He was previously superintendent of power plants, including the power houses, substations and power distribution.

William M. Bolan, who was assisting Mr. Byrd, but without a title, was appointed assistant superintendent, power department.

Promotions Announced on Pacific Electric System

Due to the death of W. C. White, late superintendent of the Western division, Pacific Electric Railway, Los Angeles, Cal., and H. C. Ward, trainmaster, Southern division, changes in the staff of the transportation department have been put into effect.

O. P. Davis, superintendent of the Southern division since 1913, has been transferred to the Western division post vacated by the death of Mr. White. Mr. Davis has had long experience as an operating officer.

Edwin Clark, formerly assistant superintendent of the Southern division, has been selected to fill the post vacated by the transfer of Mr. Davis. Mr. Clark began service with the Pacific Electric Railway as a conductor in June, 1903, and successively was promoted and served as switchman, dispatcher, chief dispatcher, carhouse foreman, trainmaster, and assistant superintendent of the Northern, Western and Southern divisions.

S. H. Cox, previously assistant trainmaster, succeeds Mr. Ward as trainmaster, Southern division. Mr. Cox entered the service of the company as passenger conductor in December, 1913, later serving as motorman, freight switching foreman, dispatcher and assistant trainmaster.

S. H. Hand, formerly supervisor, was appointed to succeed Mr. Cox as assistant trainmaster. He entered the service in August, 1912, as a motorman, Southern division, and in 1920 was appointed supervisor, which position he held until his present appointment.

A newly-created position—terminal trainmaster, Southern division—was given to E. B. Whiteside. This position involves jurisdiction over the division's freight service and within the switching limits of the Santa Monica Air Line. Mr. Whiteside entered the service of the Los Angeles & Redondo Railway as timekeeper in August, 1906, serving successfully as assistant agent in Redondo, wharfmaster, assistant trainmaster and trainmaster (freight.)

J. G. Blake was named as the successor of Mr. Whiteside, formerly trainmaster, Southern division. Mr. Blake also is a veteran, having entered the service of the company as a motorman in December, 1911, successively having served as freight conductor, terminal foreman and assistant trainmaster, until his present appointment as trainmaster of the division.

The post vacated by Mr. Blake was filled with the appointment of F. O. Bradley as assistant trainmaster. Mr. Bradley entered the employ of the company as car clerk, Los Angeles yards, in April, 1912, which post he filled until September, 1919. He later was employed as freight conductor.

G. J. Kerwin Chief Adjuster at Grand Rapids

George J. Kerwin has been appointed new chief adjuster Grand Rapids Railway, Grand Rapids, Mich., to succeed the late F. M. Webster. Announcement to this effect is made by L. J. DeLamarter, vice-president and general manager. Mr. Kerwin is known in the industry as a very capable adjuster. He began his service with the Grand Rapids Railway in June, 1905, in the adjustment department and for many years was assistant to Mr. Webster.

G. J. Kerwin

Changes in Dayton

At the stockholders' meeting of the City Railway, Dayton, Ohio, on Feb. 10 George G. Shaw was elected president, succeeding J. M. Markham. R. K. Landis was elected secretary, replacing W. S. W. Edgar in that capacity.

D. H. Goodwillie Reappointed to Toledo Board

David H. Goodwillie has been reappointed a member of the Board of Street Railway Control at Toledo. Mr. Goodwillie has just completed a two-year term as chairman of the board. He has served the entire six years since the Milner ordinance became effective. Under the rotation plan adopted by the board Henry C. Truesdall, vice-president of the Toledo Trust Company, has been named chairman and W. W. Knight of the Bostwick-Braun Company becomes secretary.

W. N. Albertson Heads New Holding Company

Walter N. Albertson, Milwaukee, has been chosen president and general manager of the $10,000,000 holding company formed in Omaha to operate public utility properties in Iowa, Nebraska, Minnesota, North and South Dakota to be known as the Central West Public Service Company, Inc. Mr. Albertson is president of W. N. Albertson & Company, Milwaukee, public utility engineers and president of the reorganized Central West Public Service Company. He expects to move from Milwaukee to Omaha soon to establish headquarters of the new enterprise there.

George N. Kalweit, formerly general auditor of the Milwaukee Electric Railway & Light Company, who held the post of vice-president and treasurer of the old Central West Public Service Company, will continue in that capacity with the new holding company.

Homer B. Carter, Sioux City, Iowa, has been appointed general counsel; R. C. Hill, Milwaukee, operating engineer; E. T. Sadler, Milwaukee, auditor, and J. F. Bailey, Jamestown, N. D., construction engineer.

Ezra Brainerd Confirmed as Commerce Commissioner

President Coolidge's nomination of Ezra Brainerd, Jr., of Oklahoma to the Interstate Commerce Commission has been confirmed by the Senate. Mr. Brainerd is a New Englander, the son of the late Ezra Brainerd. He is a lawyer and vice-president of the oldest bank in Oklahoma. He was graduated from Colgate University and the University of Michigan Law School.

P. Leroy Harwood, New London, was recently elected treasurer of the Groton & Stonington Traction Company, Mystic, Conn., following a reorganization of the company. He replaces **E. A.** Harris.

L. C. Lemon, present assistant general manager of the Tri-City Railway of Iowa and of the Clinton, Davenport & Muscatine Interurban Railway, Davenport, Iowa, has been given the additional duties of assistant general manager of the Tri-City Railway of Illinois. This change was made in connection with the promotions previously announced by the company following the assignment of T. C. Roderick to the post of general manager of the Ottumwa Gas Company, Ottumwa.

R. M. Vaughan, engineer with the California Railroad Commission for the last twelve years and valuation engineer for the last six years, resigned that position to become associated with the H. M. Byllesby Company of Chicago. Mr. Vaughan completed his electrical engineering course at the University of Missouri in 1903, and since that time has been actively engaged in engineering in Chicago and on the Pacific Coast, having been associated with Bion J. Arnold, Stone & Webster, J. G. White & Company, Puget Sound Power & Light Company and British Columbia Electric Railway.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Public Service Orders 212 New Buses

Public Service Transportation Company, Newark, N. J., a subsidiary of Public Service Corporation of New Jersey, has placed orders for 147 buses with the Mack International Motor Truck Corporation and for 65 buses with the American Car & Foundry Motors Company, according to an official announcement made Feb. 24 by John L. O'Toole, vice-president in charge of public relations.

Forty of the Mack buses will be of the gas-mechanical type, 70 of the gas-electric type, with four-cylinder engines and one electric motor, and 37 will have six-cylinder engines and one motor. The electric equipment of the 107 gas-electric buses will be manufactured by the General Electric Company.

The 65 A.C.F. buses will have six-cylinder engines, driven by two electric motors. The electric equipment will be manufactured by the Westinghouse Electric & Manufacturing Company. Bodies for all of the 65 buses are to be constructed by the company in its own shops. They will be equipped with air brakes manufactured by the Westinghouse Traction Brake Company.

The new orders will bring the company's new equipment up to 953, of which 567 will be gas-electric and 386 gas-mechanical type.

Cincinnati, Hamilton & Dayton Acquires New Carhouse

Involving an expenditure of upward of $500,000, the Cincinnati, Hamilton & Dayton Railway has purchased the buildings of the Smith Gas & Engineering Company at Morraine City, Ohio, which will be converted into carhouses and modern shops.

Purchase of the plant is part of the $1,500,000 program of reconstruction and rehabilitation recently launched by the company. The property, acquired early in February, consists of one large concrete, brick, steel and glass building, 422 ft. x 111 ft., and another structure 160 ft. x 101 ft. They are located on a 7.9-acre lot on the west side of the Springboro Pike.

In connection with the sale, 1.23 acres was purchased from the Morraine Development Company on the east side of the pike in order to provide space for the track layout. In addition to providing for the comfort of workmen and the housing of the supervisors, the new plant will contain a modern shop, all machinery to be operated by electricity. At the new plant also will be located the general offices of the company, which will be removed from the National Bank Building in Dayton.

Migration Ill-Adjusted to Business Cycles

THE flow of human tide that sweeps into the United States in boom times and out during depressions is not well timed with the fluctuations in employment opportunities, the lag varying from a few months to one year, according to a report entitled "Migration and Business Cycles," just completed by the National Bureau of Economic Research.

The report, prepared by Dr. Harry Jerome, contains the findings of an investigation intended primarily to deal with the shortage and surplus of labor in the United States and it is the first of what is to be a comprehensive series dealing with the general effects of migration upon the economic activities of the nation.

In general contour, the curves showing the fluctuations in male immigration and factory employment in the period from 1890 to the outbreak of the great war bear a marked resemblance, according to Dr. Jerome, who points out, however, that "when the two curves are closely examined to determine the extent to which the major turns in the two curves coincide, it appears that they agree most closely when it is assumed that the fluctuations in immigration lag from two to four months after the corresponding fluctuations in the employment curve."

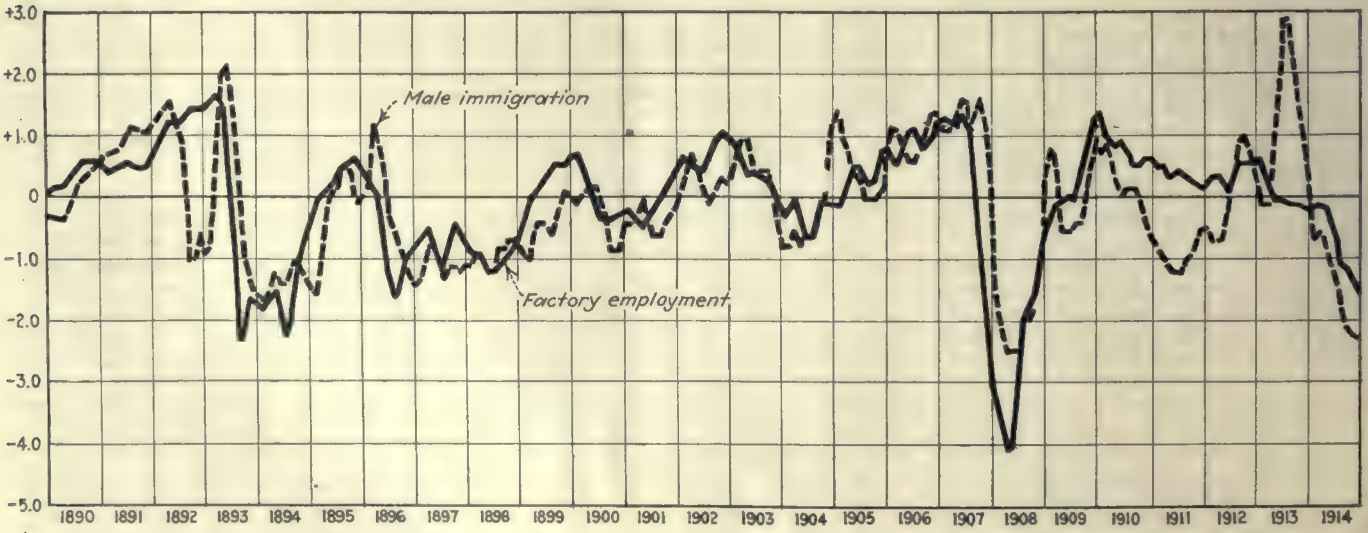
Regarding the sensitiveness of migration to business conditions, Dr. Jerome observes:

"A comparison of data pertaining to male immigration, pig iron production and factory employment in the pre-war period reveals the fact that cyclical fluctuations in male immigration are ordinarily associated with prior changes in the same direction in production and employment. The influence of a major cyclical change in industrial conditions is usually apparent in immigration within less than half a year. The cyclical movements in emigration are inversely correlated with those of immigration and employment with large emigration in depression periods and relatively small emigration in boom periods.

"The fluctuations of 'net immigration' exhibit a high degree of sensitiveness to employment conditions in the United States. This is evident when immigration and emigration are jointly considered either in terms of the ratio of emigration to immigration or in terms of the numerical excess of arrivals over departures or of departures over arrivals."

The pre-war period is more significant for the investigator's purposes, because there were at that time, on this side of the Atlantic at least, fewer legal or unusual barriers to the free flow of migration in accordance with the pull of economic motives.

During the war ordinary migratory movements were hindered by the hazards of ocean travel, the restraints placed upon their nationals by the belligerent countries and similar obstacles to the normal movement of migrants.



Courtesy National Bureau of Economic Research.

Curves of Factory Employment and Immigration 1890-1914

"Yet we must not conclude that there were no migratory movements actuated by economic motives in this period," Dr. Jerome warns. "Prior to our entry into the war a considerable fraction of the usual flow continued from neutral countries and even from the allied countries and the number of 'immigrants' recorded from British North America increased, exceeding 100,000 in each of the fiscal years 1915-16 and 1916-17. The numbers from Mexico also increased, particularly if we include those admitted during and immediately following the war period by special provision waiving the literacy test and admitting for temporary conditional sojourn to help meet the demand for labor.

"On the return of transportation to something akin to normal conditions, thousands of foreign-born residents of the United States who had been forced by war conditions to postpone a trip to their former home sailed for Europe. Among these were many returning because of changed political conditions. For example, in the three fiscal years 1920, 1921 and 1922 the emigrant aliens destined to reconstituted Poland numbered more than 90,000, most of them of the Polish race.

"Immigration, likewise, was somewhat slow to recover, not quite reaching the 250,000 mark in 1919 (calendar year). The incoming movement, however, exhibited a growing momentum and reached a total of more than 700,000 in the calendar year 1920, not including non-immigrants and even in 1921, despite industrial depression, did not drop below 50,000 per month until June, 1921, by which time the 3 per centum quota law had gone into effect.

"This law was apparently due, in part at least, to the fear that the volume of immigration in 1920 was but an indication of the growing momentum of a flood of immigrants which had been dammed up by war conditions and which now, spurred by actual or impending economic and political chaos in Europe, threatened to inundate this country with an unprecedented volume of aliens.

ECONOMIST'S PROBLEM MORE DIFFICULT

"Whatever the facts may be concerning the probability of the expected inundation, steps were taken in the law of May, 1921, which make the disentanglement of the economic trends in the subsequent period more than usually difficult. Because the quotas began to be available in July, and 20 per cent of the quota of any country could be admitted in a single month, the law has tended to concentrate the arrivals in the second half of the calendar year, thus creating a seasonal movement materially different from that characteristic of the pre-war period and obscuring the effects of industrial prosperity and depression except for those countries which were obviously falling short of the quota or, like Canada and Mexico, were not subject to the law.

"Since 1921 emigration has been consistently low, not only because of the industrial recovery from the depression conditions of 1921-22, but also because of the fact that the restriction of the incoming flow and the fear of those who are here that they may be unable to return readily if they once leave, combined with the deterring effect of unsettled political conditions and industrial depression in European countries, have kept emigration to a minimum.

MOVEMENT FROM CANADA

"The post-war movement of immigration from Canada is of special interest because the 1921 quota law did not apply to natives of Canada or to persons born in other countries who had resided there for five years.

"Leaving out of consideration citizens and non-immigrants and including only the 'immigrant alien' group, the immigration in calendar years from Canada and Newfoundland to the United States is recorded as follows:

IMMIGRATION FROM CANADA	
1919	81,179
1920	85,249
1921	52,929
1922	63,089
1923	182,369

"When adjusted for typical seasonal variation, the curve of immigration from Canada exhibits a substantial decline during the greater part of 1921; in fact, through most of 1920 a slight tendency to decline is evidenced in immigration from Canada, though the general movement of immigration from all countries is still on the up-grade, suggesting that the decline in industrial activity in the United States affected immigration from Canada more quickly than from Europe.

"That the wage-earning element in migration is most susceptible to depressions in this country may be illustrated by the fact that in severe depression years the ratio of laborers (farm laborers plus general laborers) to total immigration decreases, while the 'no occupation' group becomes a larger fraction of the total. The fiscal years 1904, 1908, 1911, 1914 and 1922 correspond with industrial depressions, and in each one of these years the 'laborers' group, in terms of percentages of the total, decreases relatively and the 'no occupation' group increases."

Canadian Car Company Slated for Montreal Car Order

According to latest reports from Montreal, the order for the 50 new cars required by the Montreal Tramways will be placed with the Canadian Car & Foundry Company in the near future. Definite decision on a few details of construction is the only thing delaying the official issuance of the order.

It is understood the contract will cover 25 motor and 25 trail cars, to be operated as two-car trains. As the approximate cost of the cars is around $17,000 each, the total amount of the contract will run in the neighborhood of $850,000. Delivery is scheduled to commence during the fall, which will give the car company the summer months in which to complete construction.

The addition of this order to the business already booked since the beginning of the year gives the Canadian Car Company around $10,000,000 worth of work with only two months of 1927 having passed. The carry over from last year amounted to $1,800,000. Taking into account the passenger and freight car orders totaling $5,000,000, approximately $1,000,000 for steel castings and specialties to be supplied to other car building plants, the present street car order, at $850,000, and some small business from the C.P.R. amounting to about $100,000, the total is $8,750,000.

Other miscellaneous business, including springs, switch and trackwork, should bring this up to the $10,000,000 mark, which is in excess of the total business handled in any year since 1924.

Worcester Consolidated Uses 500 Tons of Salt

Worcester Consolidated Street Railway recently gave the citizens of Worcester, Mass., an insight into some expenses which it must meet that are not generally known. In response to the inquiry of the city editor of a local newspaper, the company revealed that it expends about $5,000 a year for salt, which is used in winter to keep switches open. Officials of the road estimate that they use about 500 tons of salt a year at an average cost of $9.50 a ton.

Start Work on Wilkes-Barre Shops March 1

Work on a new quarter of a million dollar car shop for the Wilkes-Barre Railway Company will be started at Wilkes-Barre, Pa., on March 1 by the H. K. Ferguson Company, engineer and builder of Cleveland, which has been awarded the general contract. The car repair shops and machine shops will be completed by the middle of July, according to provisions of the contract.

Percy Owen Heads Brake Materials Corporation

The American Brake Shoe & Foundry Company, New York, announces that its new subsidiary company, American Brake Materials Corporation, which will manufacture and sell American "brakebloks," with main offices and factory in Detroit, will be under the presidency of Percy Owen, for years prominently connected with the automotive industry. Other officers are largely leading officials of the American Brake Shoe & Foundry Company.

The manufacture of American "brakebloks" is the result of years of study on the part of the American Brake Shoe & Foundry Company, to find a method whereby the railroad principles of braking may be applied not only to automotive vehicles but also to all industrial uses where long life and the elimination of replacement are essentials.

The problem was to evolve a material which should be so hard as to be practically non-wearing, thus largely eliminating replacement, and yet of a character which would not score brake drums; which would be so effective that it could be placed in segments, rather than in a continuous unit, thus allowing the dissipation of heat as well as the dissipation of destroyed surface material which would otherwise invalidate the friction surface. The company says of the new product:

> After a great deal of research and experimentation, a material was invented which has the hardness of 35 carbon steel, but which will not score brake drums, which is not readily conductive of heat, which acts equally well even when drenched with oil or water, which does not squeal and which is of such durability as to outwear by three or four times all previous friction materials developed.
>
> It will be seen, therefore, that the invention of this material makes possible an entirely new system of automotive braking, which will of course at first be of particular interest to bus and truck manufacturers and manufacturers of passenger cars who wish to equip their vehicles with the ultimate in safety, eliminating at the same time for the car user the necessity for frequent replacements, with resultant loss of vehicle use.

The company is arranging for production at its factory in Detroit to supply some of the largest manufacturers of buses and trucks with American "brakebloks" for utilization in their braking systems.

B.-M. T. Equipping New Triplex Cars

Work has been begun by the Brooklyn-Manhattan Transit Corporation in its new Coney Island shops on equipment of the first of the 67 new triplex cars ordered about a year ago from the Pressed Steel Car Company and delivered two weeks ago. Mechanics commenced equipping this three-car unit early last week. The single car now undergoing completion is the first triplex unit of the original group purchased by the B.-M. T. Within a week five more of the 67 are expected to reach Brooklyn, and ten days later regular deliveries of two or three a week are expected.

Rolling Stock

Lorain Street Railroad, Lorain, Ohio, is reported as a possible purchaser of new street cars and other equipment. Engineers and traction experts are now making an investigation to determine the type of cars and kind of equipment which can be used most successfully, according to Martin Ackerman, general manager of the Lake Shore Electric Railway, the parent company.

Stark Electric Railroad, Alliance, Ohio, has purchased three one-man cars from the Boston Elevated Railway, Boston, Mass. One car is in service, while the others are en route. The equipment thus secured will replace three cars borrowed from the Northern Ohio Power Company, when one-man service was adopted for Alliance city service several months ago. The Northern Ohio Power cars are to be returned.

Track and Line

Worcester Consolidated Street Railway, Worcester, Mass., has filed three petitions for track changes with the city authorities growing out of the city's assent to the act authorizing the New York, New Haven & Hartford Railroad to resume control of the trolley property. The first petition seeks authority to lay a single track through Commercial Street from Foster to Front Street. A second petition asks permission to add a second track on Foster Street from Main to Commercial Streets. A connection for the proposed double-track line on Foster Street with the Summer Street tracks is covered by the third petition recently filed.

Pacific Electric Railway, Los Angeles, Cal., has approved more than $650,000 worth of roadbed improvement for attention by engineering department forces at various points on the system. The work, for the most part, involves replacement of worn trackage to the amount of approximately 15 miles, with 90 and 128-lb. rail and fittings. In addition, the work of constructing temporary shoofly track is now under way, preparatory to the construction of the Pico Boulevard grade separation on the West Sixteenth Street line at Vineyard Junction.

Power Houses, Shops and Buildings

Worcester Consolidated Street Railway, Worcester, Mass., has taken the first steps toward the erection of a new carhouse in the parking space which it has used for car storage on Grove Street in that city. Henry R. Kent & Company of New York, engineers, have been engaged to study the possibilities of the site not only from the operating carhouse point of view but from that of the garage facilities as well. If the plans of the company are followed the carhouse will be used for minor repairs and the yard facilities employed for storage. The Market Street carhouse, which is located nearer the center of the city, will then be overhauled and used only for major repairs to cars. The proposed new carehouse will be 200 ft. x 190 ft., of brick construction, and will have a capacity of about 40 cars. There will be a starter's office, a lobby for the men, stock room, repair shop and car washing room.

Trade Notes

Hill Clutch Machine & Foundry Company, Cleveland, Ohio, recently appointed Charles C. Phelps, 473 Getty Avenue, Paterson, N. J., as sales engineer for the metropolitan New York and northern New Jersey district. The Hill Clutch Machine & Foundry Company manufactures everything for power transmission such as shafting, couplings, bearings, clutches, pulleys, sheaves, belt tighteners, speed transformers, agitators, gears and sprockets. The featured products of the company are the Cleveland type oil-film bearings, Smith type friction clutches, steel arm automatic belt tighteners, forged cast spur gears, industrial type spur gear speed transformers and flexible couplings.

Root Spring Scraper Company, Kalamazoo, Mich., is making life guards for the sixteen cars being built by J. G. Brill, Philadelphia, Pa., for the Honolulu Rapid Transit Company.

New Advertising Literature

Electric Controller & Manufacturing Company, Cleveland, Ohio, has just published two bulletins, 1037-C and 1042-F. Bulletin 1037-C describes type B limit stops for use with alternating and direct current motors. Bulletin 1042-F describes automatic compensators for 100 to 550-volt a.c. squirrel cage and synchronous motors.

Irving Iron Works Company, Long Island City, N. Y., is issuing a descriptive folder of its subway flooring grills which are applicable to street car steps, etc.

Ohio Brass Company, Mansfield, Ohio, has issued a novel folder directing attention to the co-operation of its engineers in the recent catenary installation on the Chicago, South Shore and South Bend Railroad. The text matter is a reprint of an article "High Current Capacity with Exceptional Flexibility Feature of Catenary" by L. W. Birch, line material engineer of the company, which appeared in the ELECTRIC RAILWAY JOURNAL for Nov. 27, 1926.

Lebanon Steel Foundry, Lebanon, Pa., is mailing out a descriptive folder covering its steel castings for electric furnaces.

Crouse-Hinds Company, Syracuse, N. Y., is issuing bulletins Nos. 220, 2097 and 221 setting forth electric flashing beacons, groundulets and its type B automatic variable timing switches and control cabinets, respectively. Bulletin No. 220 has some interesting diagrammatic sketches illustrating the use of electric flashing beacons as a protection for safety zone platforms in street railway work.

D. B. Flower, manufacturer of electric railway accessories, Philadelphia, Pa., has just issued two booklets describing the application of the Flower new type brush-holder. The design and performance of this new device are adequately presented by pithy text matter and illustrations.

J. G. Brill Company, Philadelphia, Pa., has a new bulletin in the mails describing its 76-E truck with outside hung motors. The bulletin also contains information on such accessories as solid forged side frames, transoms, side bearings, bolster guides, graduated spring systems, etc.

Metal, Coal and Material Prices

Metals—New York	Feb. 23, 1927
Copper, electrolytic, cents per lb	12.746
Copper wire, cents per lb	15.00
Lead, cents per lb	7.40
Zinc, cents per lb	7.16
Tin, Straits, cents per lb	69.875
Bituminous coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.625
Somerset mine run, Boston, net tons	2.00
Pittsburgh mine run, Pittsburgh, net tons	1.85
Franklin, Ill., screenings, Chicago, net tons	2.175
Central, Ill., screenings, Chicago, net tons	1.875
Kansas screenings, Kansas City, net tons	2.425
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$5.50
Weatherproof wire base, N.Y., cents per lb.	16.75
Cement, Chicago net prices, without bags	2.05
Linseed oil (5-bbl. lots), N. Y., cents per lb	10.80
White lead in oil (100-lb. keg), N. Y., cents per lb	14.50
Turpentine (bbl. lots), N. Y., per gal	$0.69

Canadian Electric Railways continue to specify—

"Peacock" Staffless Brakes!

REG. U. S. PAT. OFF.

Hamilton Street Railway, Hamilton, Ont., Canada, expects delivery in May, 1927, of 24 single-end, semi-convertible street cars, ordered Nov. 12 from the National Steel Car Corporation, Ltd., also of Hamilton. The units will be of semi-steel construction, steel frames and steel girder plates for the inside side finish being specified, while the outside sheathing below the windows will be of ¼-in. Plymetl. Seats for 48 passengers will provided, these to be upholstered in genuine Spanish leather. Following are the principal specifications:

Weights:	
Car body	19,000 lb.
Trucks	8,000 lb.
Equipment	7,000 lb.
Total	34,000 lb.
Bolster centers, length	18 ft. 2 in.
Length over all	40 ft. 11 in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 3¼ in.
Height, rail to trolley base	10 ft. 9¾ in.
Body	Semi-steel
Interior trim	Cherry
Headlining	Haskelite
Roof	Arch
Air brakes	Westinghouse
Axles	4-in. steel
Bumpers	Anti-climber
Car signal system	Consolidated Car Heating Co.
Center and side bearings	Perry-Hartman ball bearings
Compressors	Westinghouse
Control	K-35
Couplers	Emergency
Destination signs	Hunter
Door-operating mechanism	National Pneumatic Co.
Fare boxes	Cleveland
Fenders	H-B life guard
Gears and pinions	Helical
Hand brakes	Peacock Staffless
Heater equipment	Consoliated Car Heating Co.
Headlights	Golden Glow
Journal bearings	Friction
Journal boxes	MCB
Lightning arresters	Westinghouse
Motors	510-A-2 Westinghouse Interpole, inside hung
Paint	Duco
Sanders	O. W. Meissner's
Sash fixtures	O. M. Edwards
Seats	Ottawa Car Company
Seating material	Spanish leather
Slack adjuster	Westinghouse
Springs	Coil and elliptic
Step treads	Irving Subway
Trolley catcher	Ohio Brass
Trolley base	U. S. No. 13
Trucks	National Steel Car
Ventilators	Nichols-Lintern
Wheels	26-in. rolled steel
Special devices, etc	Westinghouse treadle step, automatic air control

No matter where new cars are ordered, invariably "Peacock" Staffless Brakes are included in the specifications. Many of the Canadian electric railway cars are thus equipped, and the Dominion's railways are specifying them on nearly all their modern cars.

The latest Canadian property to specify "Peacock" Staffless Brakes is the Hamilton Street Railway of Hamilton, Ontario.

They are specified on nearly all modern cars because they occupy little platform space, they have three times the braking capacity of ordinary hand-brakes, almost unlimited chain-winding capacity (144 inches if necessary), low installation and maintenance cost and are simple to operate.

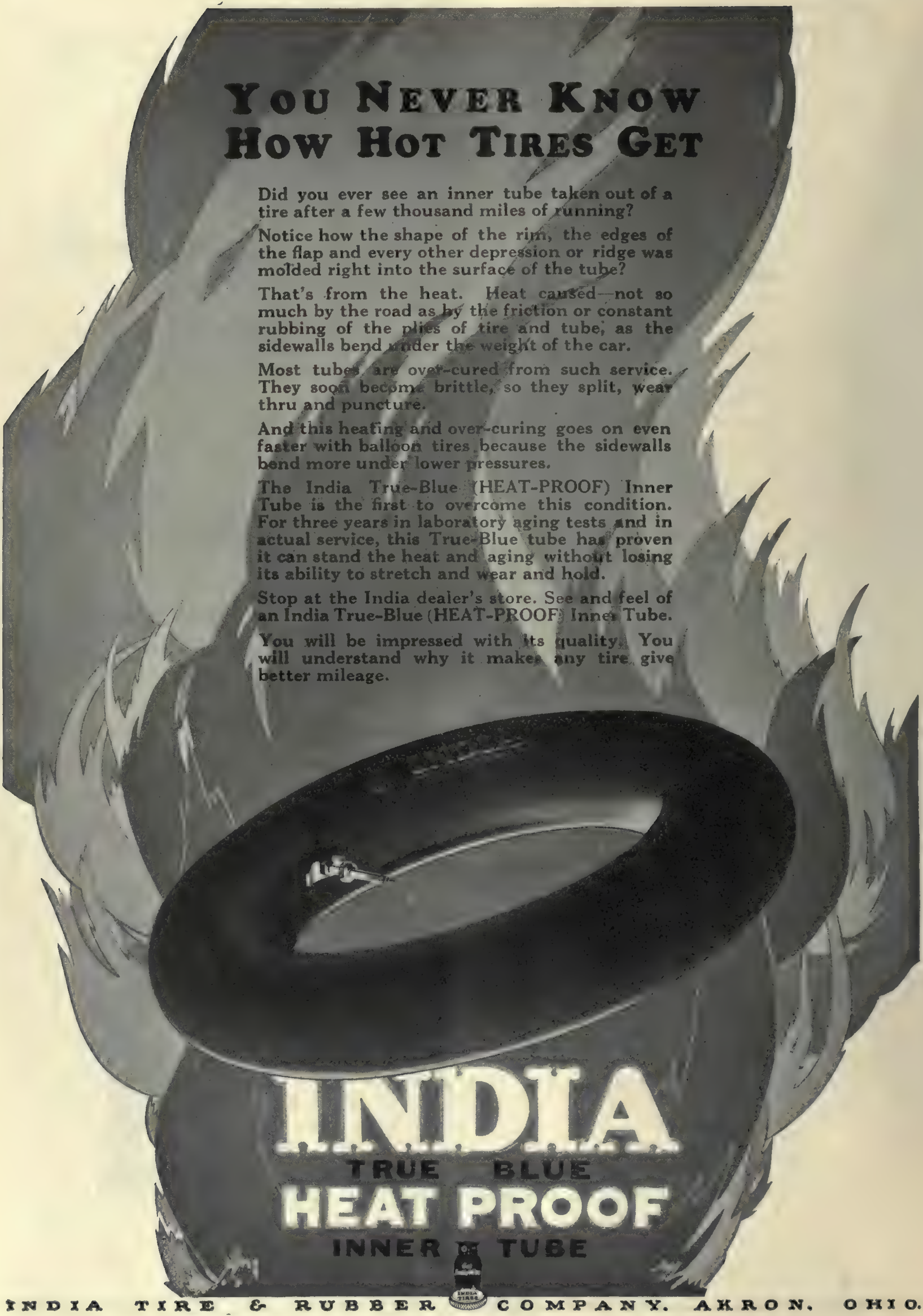
May we furnish you with performance facts and figures?

The "Peacock" Staffless

National Brake Company, Inc.

890 Ellicott Square Buffalo, N. Y.

Canadian Representative:
Lyman Tube & Supply Co., Ltd., Montreal, Can.



YOU NEVER KNOW HOW HOT TIRES GET

Did you ever see an inner tube taken out of a tire after a few thousand miles of running?

Notice how the shape of the rim, the edges of the flap and every other depression or ridge was molded right into the surface of the tube?

That's from the heat. Heat caused—not so much by the road as by the friction or constant rubbing of the plies of tire and tube, as the sidewalls bend under the weight of the car.

Most tubes are over-cured from such service. They soon become brittle, so they split, wear thru and puncture.

And this heating and over-curing goes on even faster with balloon tires because the sidewalls bend more under lower pressures.

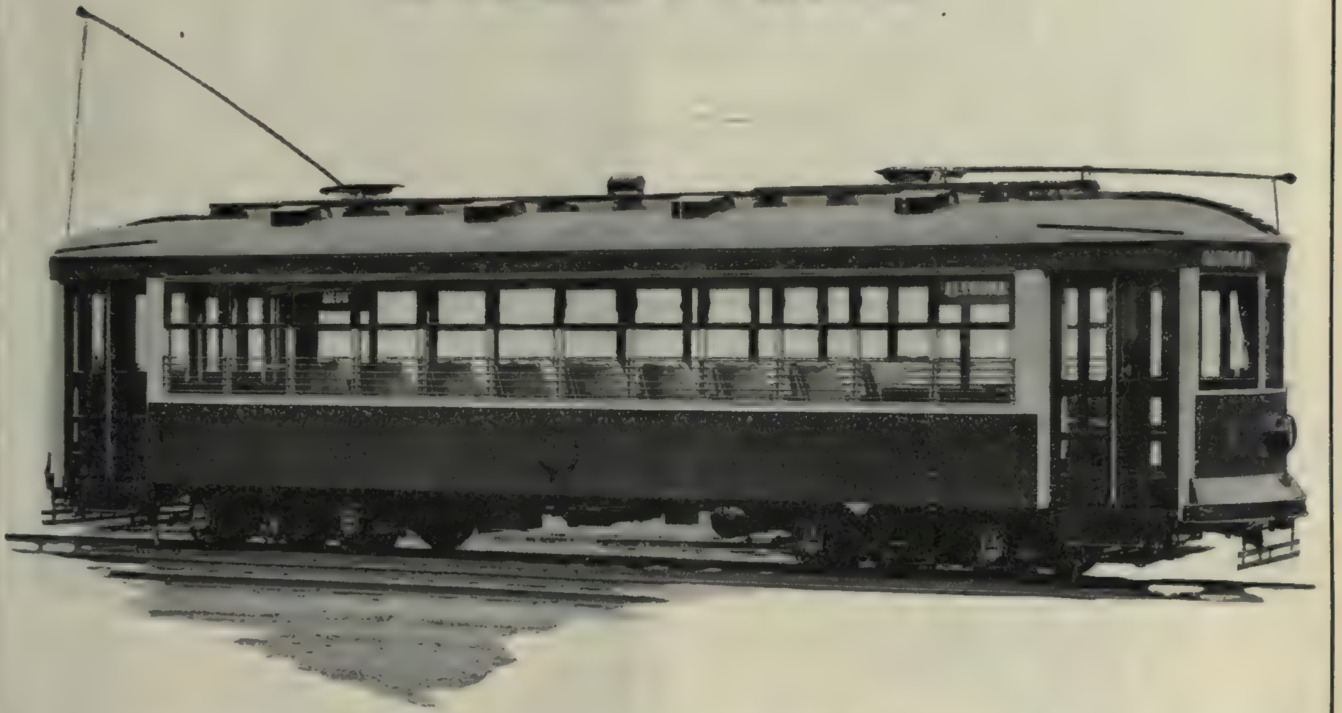
The India True-Blue (HEAT-PROOF) Inner Tube is the first to overcome this condition. For three years in laboratory aging tests and in actual service, this True-Blue tube has proven it can stand the heat and aging without losing its ability to stretch and wear and hold.

Stop at the India dealer's store. See and feel of an India True-Blue (HEAT-PROOF) Inner Tube.

You will be impressed with its quality. You will understand why it makes any tire give better mileage.

INDIA TIRE & RUBBER COMPANY, AKRON, OHIO.

"STANDARD"
STEEL PARTS



Maintenance That Starts With Purchase

MAINTENANCE of cars is not merely a matter of inspection, replacement, shopping and repair. Farsighted maintenance must start with purchase—in the selection of equipment which will cause the least concern, call for the least attention and entail the least expense thereafter. To specify "Standard" Steel Axles, Armature Shafts, Wheels and Springs is to simplify your maintenance problems.

STANDARD STEEL
WORKS COMPANY
PHILADELPHIA, PA.

BRANCH OFFICES:
CHICAGO
ST. LOUIS
NEW YORK
HOUSTON, TEXAS
PORTLAND, ORE.
RICHMOND, VA.
SAN FRANCISCO
ST. PAUL, MINN.
PITTSBURGH, PA.

WORKS: BURNHAM, PA.

Their lubrication need not be wasteful!

The first step to increased dividends without fare raising is the elimination of waste in operating practices. It's the same with electric cars or buses.

In the case of buses, the De Laval Crankcase Oil Reclaiming Outfit justifies its installation by savings many times in excess of its cost. Savings not only of oil, but of increased bearing life, and reduced labor hours because of fewer inspections or overhaul periods.

Because of the comparatively low cost of reclamation oil can be changed more frequently—before it becomes an abrasive rather than a lubricant. More hours on the road and fewer in the repair shop is the natural result. That's what really increases dividends.

The reclaimed oil is clean as a hound's tooth. Ready to be put back into the same crankcase from which it was drained—without *any* new oil as make up—cleansed of the solid and liquid contamination that destroyed its value as a lubricant.

In writing for further information be sure to ask for Bulletin 108-R. If you operate electric cars ask about a combination outfit to reclaim car axle oil also.

THE DE LAVAL SEPARATOR COMPANY
165 Broadway, New York 600 Jackson Blvd., Chicago
DE LAVAL PACIFIC COMPANY, San Francisco
ALFA-LAVAL CO., Ltd., 34 Grosvenor Road, London, S.W. 1

DE LAVAL

Crankcase Oil Reclaiming Outfit
Car Axle Oil Reclaiming Equipment-Transformer Oil Purifiers

Growing . . . . Growing . . . . Growing

Year by year metropolitan population grows larger, more active, more congested. . . . . Year by year, as a result, greater and still greater demands are made upon transportation.

How the electric railway industry has met these demands is best indicated by the rapid evolution from the horse car and cable car era to the era of the big comfortable cars of today.

While it is the coach of the electric car that carries the passengers, it is the *wheels* that carry the coach, ... Gary Wrought Steel Wheels are especially designed to meet the strenuous demands of present day traffic conditions.

Illinois Steel Company
General Offices:
208 South La Salle Street
Chicago, Illinois

Ties in perfect condition after 14 years of service..

IN WIDENING paved streets in New Orleans recently, street railway tracks were torn up which had been built with creosoted pine ties 14 years ago. These ties treated with 12 lbs. of oil per cubic foot were removed from concrete pavement and found in perfect condition. They were stored for future use. In all new construction, pine ties with a 6 lb. open cell treatment were used.*

Modern methods of roadway construction demand treated ties. The old policy that ties need not last longer than the paving, or the life of the rail in heavy traffic, is no longer sound. Tracks are so frequently torn up for one reason or another before the life of even untreated ties is gone that ties should be used that will last as long as the paving and rail and still be available for re-use.

Can you say as much for your ties? If not, order Amcreco creosoted ties for your next installation.

AMERICAN CREOSOTING COMPANY
INCORPORATED

COLONIAL CREOSOTING COMPANY INCORPORATED
AMCRECO LOWRY PROCESS CREOSOTED WOOD
GEORGIA CREOSOTING COMPANY INCORPORATED

LOUISVILLE ~ KENTUCKY

SALES OFFICES

332 So. Michigan Ave.
Chicago

350 Madison Ave.
New York City

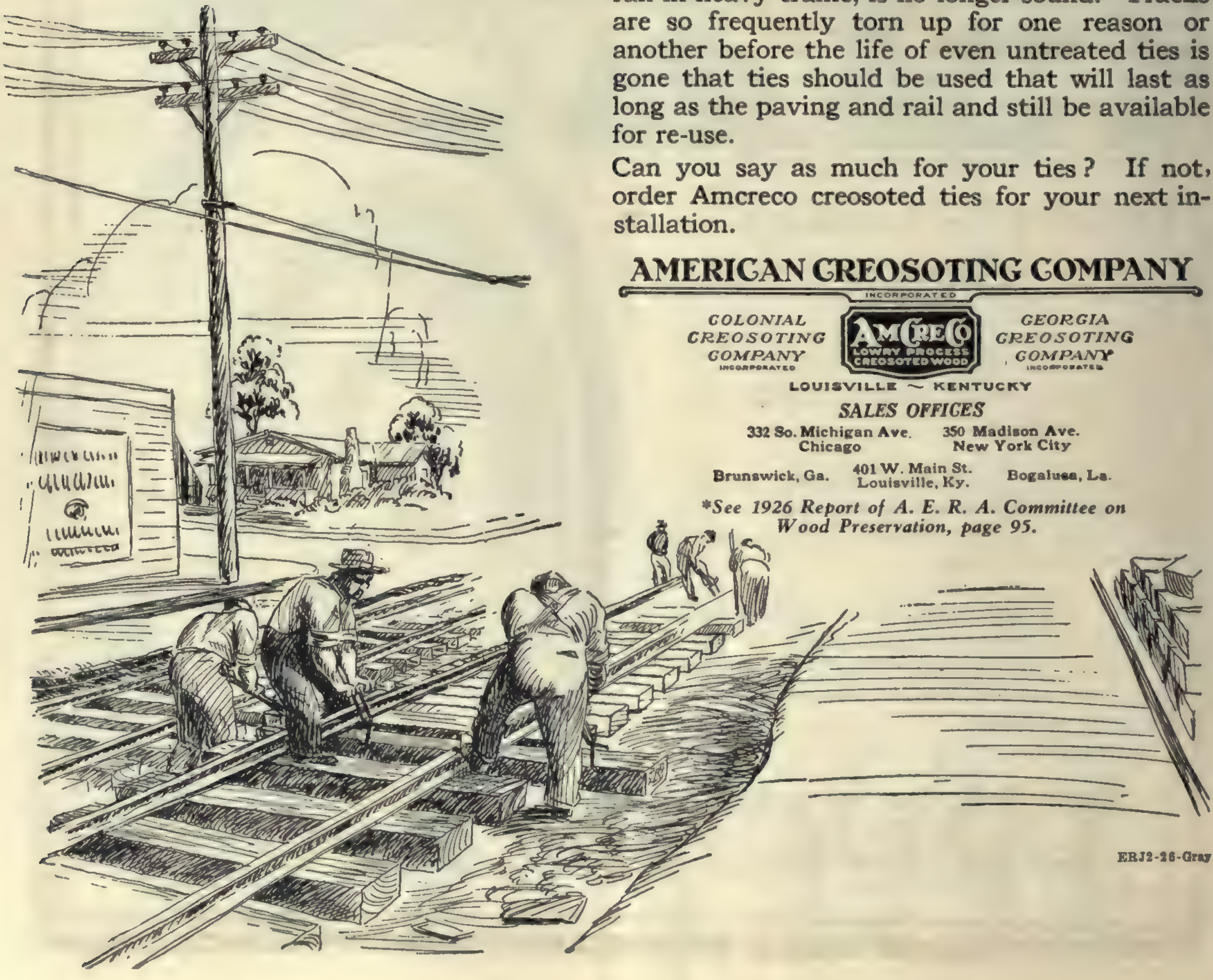
Brunswick, Ga.

401 W. Main St.
Louisville, Ky.

Bogalusa, La.

**See 1926 Report of A. E. R. A. Committee on Wood Preservation, page 95.*

ERJ2-26-Gray



TONCAN For Permanence

REG. U.S. PAT. OFF.
TONCAN
COPPER
Mo-lyb-den-um
IRON

at a reasonable cost

THE mechanical advantages of the corrugated type of culvert are thoroughly established.

Safety in shipment; ease of handling; a saving of 75% in installation costs; and strength to meet the most severe requirements have been proven by thousands of installations.

Corrosion is the corrugated culvert's worst enemy and now that too is checked by making the culverts of Toncan Iron. To iron that has been thoroughly refined are added copper and molybdenum. These two elements alloy with the iron and impart a corrosion resistance that has never been reached before.

Thus Toncan Iron is particularly fitted for the permanence which is so necessary in culverts. Yet Toncan costs no more.

Following are the makers
of Toncan Culverts.
Write the nearest one:

The Berger Manufacturing Co.
Roanoke, Virginia

Tri-State Culvert Manufacturing Co
Memphis, Tenn.

The Canton Culvert & Silo Co.
Canton, Ohio

The Firman L. Carswell Mfg. Co.
Kansas City, Kan.

The Berger Manufacturing Co.
Minneapolis, Minn.

The Berger Manufacturing Co., of Mass.
Boston, Mass.

The Berger Manufacturing Co.
Philadelphia, Pa.

The Berger Manufacturing Co.
Dallas, Texas

The Berger Manufacturing Co.
Jacksonville, Florida

The Pedlar People, Limited
Oshawa, Ontario, Canada

CENTRAL ALLOY STEEL CORPORATION, *Massillon*, OHIO
Makers of Agathon Alloy Steels

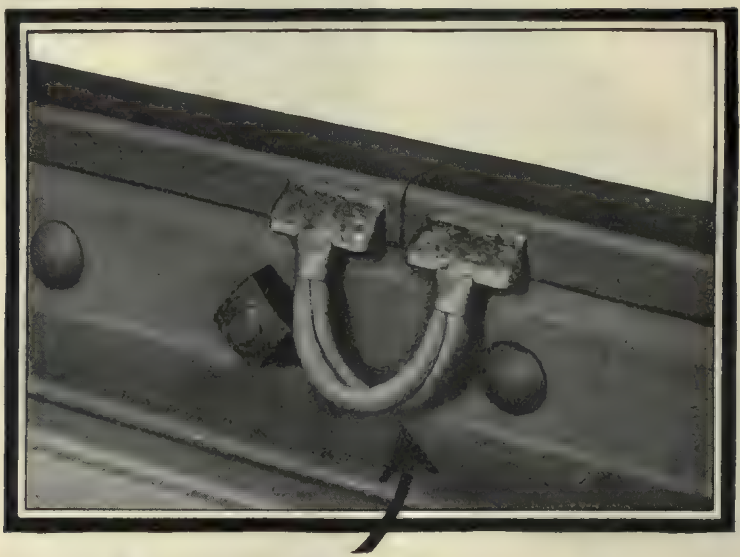
Cleveland Detroit Chicago New York St. Louis
Syracuse Philadelphia Los Angeles Tulsa
Cincinnati San Francisco Seattle

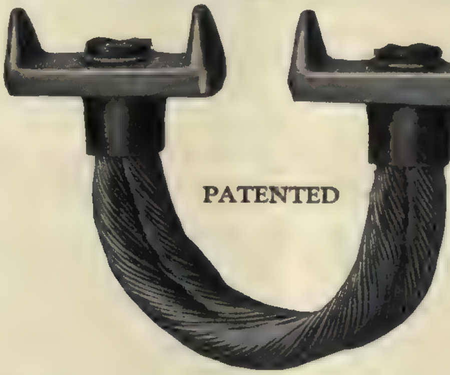
TONCAN IRON

American Steel & Wire Company's

ARCON RAIL BONDS

Trade Mark Registered





Arcon "A" Bond in detail and installed

A NEW principle of design is embodied in Arcon Rail Bonds. *This is the open terminal.*

The open terminal has many distinct advantages. All terminals provide for *easy* arc manipulation. The end of the copper conductor is approximately one-eighth of an inch from the rail, and located in an open space which insures perfect welding of the copper wires. The sloping surface of the terminal after welding is a novel and important feature in arcweld bonds.

Be convinced by a practical demonstration which we will gladly give you at your convenience.

Prices and literature mailed upon request.

SALES OFFICES

CHICAGO . . . 208 So. La Salle Street
CLEVELAND . . Rockefeller Building
DETROIT . . . . . . Foot of First Street
CINCINNATI . Union Trust Building
MINNEAPOLIS – ST. PAUL . . . . . Merchants Nat'l Bk. Bldg., St. Paul

ST. LOUIS . . . . . 506 Olive Street
KANSAS CITY . . 417 Grand Avenue
OKLAHOMA CITY . . . . First Nat'l Bank Bldg.
BIRMINGHAM . . Brown-Marx Bldg.
MEMPHIS . . . . Union and Planters Bank Bldg.

NEW YORK . . . . . 30 Church Street
BOSTON . . . . . . 185 Franklin Street
PITTSBURGH . . . . . . Frick Building
PHILADELPHIA . . Widener Building
ATLANTA . . . . . 101 Marietta Street

WORCESTER . . . . . 94 Grove Street
BALTIMORE . . 32 So. Charles Street
BUFFALO . . . . . . 670 Ellicott Street
WILKES-BARRE . Miners Bk. Bldg.

DALLAS . . . . . . Praetorian Building
DENVER . . First National Bank Bldg.
SALT LAKE CITY . Walker Bk. Bldg.

UNITED STATES STEEL PRODUCTS COMPANY, San Francisco, Los Angeles, Portland, Seattle

A LINE is no more reliable than its poles. For power and service lines, where reliability is paramount, use Creosoted Yellow Pine Poles for they are strongest longest. Past performances during terrific storms prove the superiority of Creosoted Pine. A large company operating through the storm area showed only 0.3% of Creosoted Pine Poles broken while more than 9.0% of the Poles of other species were destroyed. Creosoted Pine's excellent showing is due to its 44% greater strength over the nearest other pole species and to its permanent strength. There is no decay. Nor is there that gradual decrease in strength immediately after setting, which makes untreated poles easy prey for wind and ice storms.

International poles are quality poles. They have been time tested by more than 28 years of service with less than 1% of renewals; and they are in use from coast to coast.

Illustration shows International Creosoted Pine Poles near North Platte, Nebr.

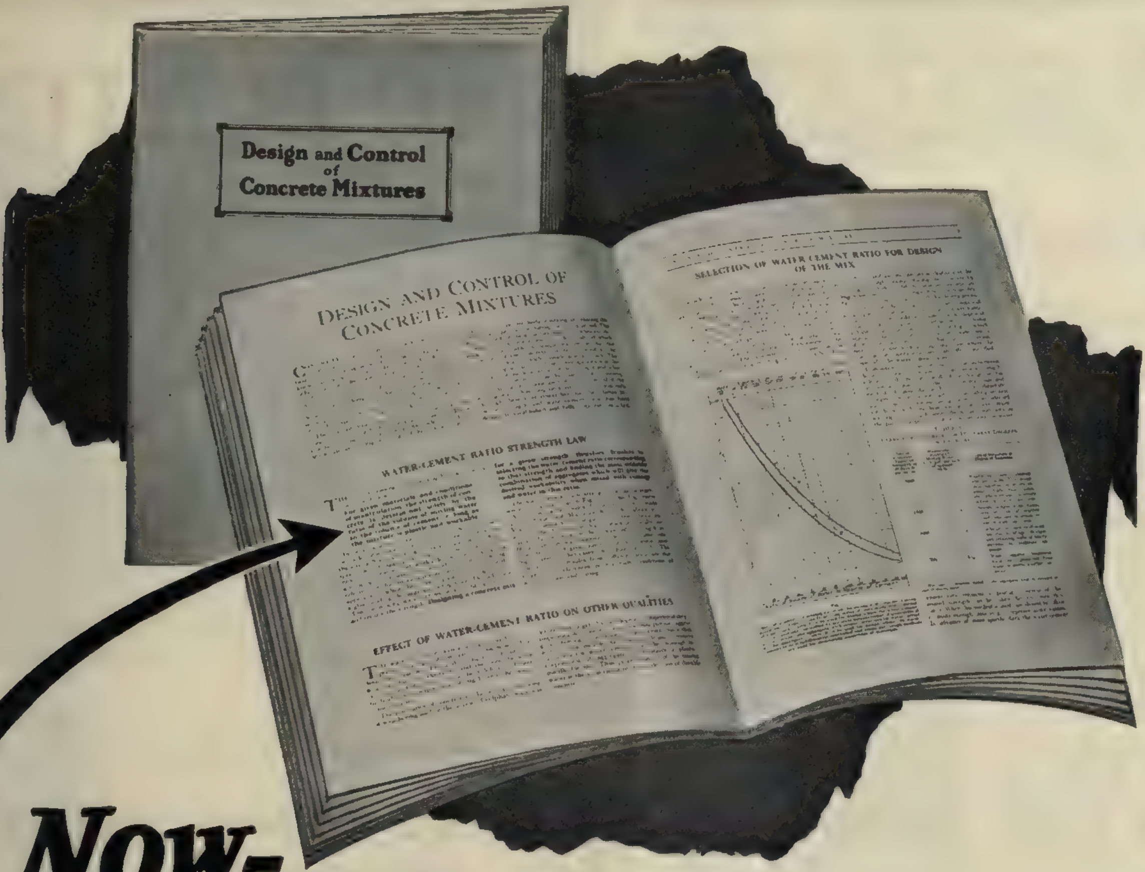
International Creosoting & Construction Co.

Texarkana Beaumont Galveston

An increasingly large portion of the actual income derived from car card advertising service must be devoted to building and maintaining the prestige of car card advertising in the face of the active competition of all other media.

Creating and protecting our mutual interest is a costly item.

Barron G. Collier
INCORPORATED
CANDLER BLDG. NEW YORK


Design and Control of Concrete Mixtures
DESIGN AND CONTROL OF CONCRETE MIXTURES
WATER-CEMENT RATIO STRENGTH LAW
EFFECT OF WATER-CEMENT RATIO ON OTHER QUALITIES
SELECTION OF WATER CEMENT RATIO FOR DESIGN OF THE MIX

NOW-

Predetermined Strength and Quality !

"For given materials and conditions of manipulation, the strength of concrete is determined solely by the ratio of the volume of mixing water to the volume of cement so long as the mixture is plastic and workable."

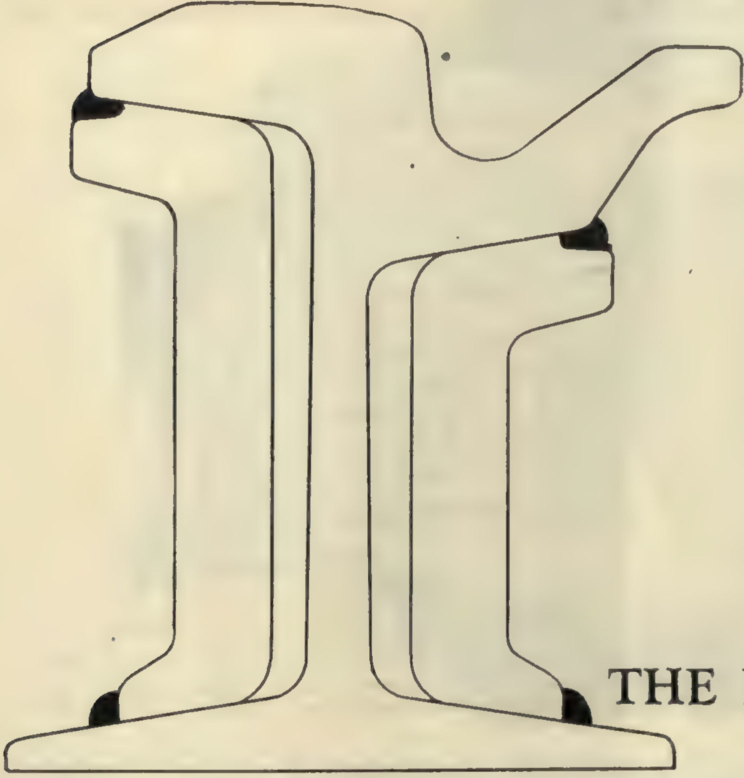
The application of the Water-Cement Ratio Strength Law, as quoted from the newly published booklet, "Design and Control of Concrete Mixtures," makes possible the production of concrete of *predetermined* strength and quality.

This book emphasizes the importance of Water-Cement Ratio on the other qualities of concrete—such as water tightness and durability. A considerable section is devoted to selection of materials, estimation of quantities, importance of curing, and control of concrete in the field.

It is difficult to overestimate the importance of these subjects to all who employ concrete in building. They are thoroughly explained and discussed in the new booklet which is a practical aid to designer and builder. A free copy of "Design and Control of Concrete Mixtures" will be sent to you upon request.

PORTLAND CEMENT *Association*

Concrete for Permanence CHICAGO



"WELD PLATES"

For EFFICIENT, ECONOMICAL

JOINTS

Do you believe in statistics? Rely on performance records? If so the performance records of the many "Weld Plates" now in use will convince you that they lead the bar-weld joints in efficiency and economy.

"Weld Plates" represent the most modern welding practice. They are the strongest and most up-to-date plates rolled especially for electric welded joints. Note the shape—the grooves for retaining plenty of weld metal along the upper edges—the wide contact areas at top and bottom—the suitability for the use of short bolts.

A trial will convince you of their efficiency and economy.

THE RAIL JOINT COMPANY

165 Broadway, New York

MORE-JONES TROLLEY WHEELS AND HARPS

WE MANUFACTURE various types of trolley equipment. The quality of metal, conductivity, resistance to friction, effect on overhead, shape and size of wheel groove, have all been carefully worked out and perfected. In addition to the highly specialized V-K Oilless Trolley Wheels and Harps, More-Jones make the most complete line of lubricated trolley wheels and harps to meet all requirements. Let us quote you.

More-Jones Brass & Metal Co.
St. Louis, Mo.

MORE-JONES
QUALITY PRODUCTS

Griffin Wheel Company
410 North Michigan Ave.
Chicago, Ill.

Griffin Wheels
with
Chilled Rims
and
Chilled Back of Flanges
For Street and Interurban Railways

FOUNDRIES:

Chicago
Detroit
Denver
Cleveland

Boston
Kansas City
Council Bluffs
Salt Lake City

St. Paul
Los Angeles
Tacoma
Cincinnati

Shuler

Front Axles

For: Motor Busses

No Compromise With Safety

In Manufacturing the FRONT AXLE—which takes all the bumps, ruts and irregularities of the road "Head-on"—there can be no compromise with safety.

This is a paramount thought in the selection of your FRONT AXLE for the Motor Bus.

Shuler Axle Co.
Incorporated
LOUISVILLE, KY.

Member of Motor Truck Industries, Inc. of America

Nuttall

Standard Helical Gears

The contact between a gear tooth and a pinion tooth is a combination of sliding and rolling, and the sliding contact is the cause of wear.

In Nuttall Helical Gears this sliding contact is at least 50% less than in spur gears, so the wear is materially reduced, and is uniformly distributed over the entire contact surface. As a consequence the teeth retain their correct involute form until worn to a sharp edge.

This results in longer wear, longer life, less maintenance cost, less renewal cost, and it is perfectly true to say that while Nuttall BP Helical Gearing is the longest-lived in the world, it is the cheapest.

Do you want to see actual operating cost data to prove this?

Write for our Helical Gear Book

R.D.NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railways and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

Nuttall

Bankers and Engineers

Ford, Bacon & Davis
Incorporated
Engineers
115 Broadway, New York
PHILADELPHIA CHICAGO SAN FRANCISCO

STONE & WEBSTER
Incorporated
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ON
INDUSTRIAL AND PUBLIC SERVICE PROPERTIES
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SANDERSON & PORTER
ENGINEERS
PUBLIC UTILITIES & INDUSTRIALS
Design Construction Management
Examinations Reports Valuations
CHICAGO NEW YORK SAN FRANCISCO

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER, MASSACHUSETTS
REPORTS - APPRAISALS - RATES - OPERATION - SERVICE

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Engineering and Management, Construction
Financial Reports, Traffic Surveys
and Equipment Maintenance
BALTIMORE
1904 Citizens National Bank Bldg.
Phone: Hanover: 2142
NEW YORK
49 Wall Street

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CONSULTING ENGINEERS
Gardner F. Wells Albert W. Hemphill
APPRAISALS
INVESTIGATIONS COVERING
Reorganization Management Operation Construction
43 Cedar Street, New York City

WALTER JACKSON
Consultant on Fares and Motor Buses
The Weekly and Sunday Pass—Differential Fares—Ride Selling
143 Crary Ave., Mt. Vernon, N. Y.

KELLY, COOKE & COMPANY
ENGINEERS
Operation and Management
Traffic and Transportation Surveys
PARKWAY at SIXTEENTH ST. PHILADELPHIA

The J. G. White Engineering Corporation
Engineers—Constructors
Oil Refineries and Pipe Lines, Steam and Water Power Plants, Transmission Systems, Hotels, Apartments, Office and Industrial Buildings, Railroads.
43 Exchange Place New York

THE BEELER ORGANIZATION
Transportation, Traffic, and Operating Surveys
Coordinating Service—Financial Reports
Appraisals—Management
52 Vanderbilt Ave. **New York**

ENGELHARDT W. HOLST
Consulting Engineers
Appraisals Reports Rates Service Investigation
Studies on Financial and Physical Rehabilitation
Reorganization Operation Management
683 Atlantic Ave., BOSTON, MASS.

LINN & MARSHALL, *Inc.*
Financing — Engineering — Management
PUBLIC UTILITIES
ELECTRIC RAILWAYS — MOTOR BUSES —
GAS — ELECTRIC
25 Broadway, New York City

DAY & ZIMMERMANN, INC.
ENGINEERS
DESIGN - CONSTRUCTION - REPORTS
VALUATIONS - MANAGEMENT
NEW YORK PHILADELPHIA CHICAGO

STEVENS & WOOD
INCORPORATED
ENGINEERS AND CONSTRUCTORS
120 BROADWAY, NEW YORK
ENGINEERING CONSTRUCTION YOUNGSTOWN, O. FINANCING MANAGEMENT

McCLELLAN & JUNKERSFELD
Incorporated
ENGINEERING AND CONSTRUCTION
Examinations—Reports—Valuations
Transportation Problems—Power Developments
68 Trinity Place, New York
Chicago St. Louis

J. ROWLAND BIBBINS
Engineer—2301 Connecticut Ave., N.W., Washington, D. C.
TRANSPORTATION SURVEYS
Organized Traffic Relief and Transit Development
Co-ordinating Motor Transport, Railroad and City Plans, Service, Routing, Valuation, Economic Studies
EXPERIENCE IN 20 CITIES

THE BABCOCK & WILCOX COMPANY
85 LIBERTY STREET, NEW YORK

Builders since 1868 of
Water Tube Boilers
of continuing reliability

BRANCH OFFICES
BOSTON, 49 Federal Street
PHILADELPHIA, Packard Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
PHOENIX, ARIZ., Heard Building
DALLAS, TEX., 2001 Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., 805 Gasco Building

THE BABCOCK & WILCOX COMPANY
STEAM

WORKS
Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters
since 1898 and of Chain Grate
Stokers since 1893

BRANCH OFFICES
DETROIT, Ford Building
NEW ORLEANS, 344 Camp Street
HOUSTON, TEXAS, 1011-13 Electric Building
DENVER, 444 Seventeenth Street
SALT LAKE CITY, 405-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building

A. B. COLE
Commercial Consultant
Merchandising and Co-ordination
of Transportation
500 Shelbourne Ave., Wilkinsburgh, Pa. (Pittsburgh)

Our advertisement in the issue of February 19 showed how
HASKELITE and PLYMETL
cut the dead load and increase the factor of safety in reconditioned cars. Haskelite has been specified on two recent orders for repair work for Dayton & Western Traction Co., Dayton, Ohio.
Another ad will appear next week.
HASKELITE MANUFACTURING CORPORATION
133 W. Washington St., Chicago, Ill.

KELKER, DeLEUW & CO.
CONSULTING ENGINEERS
REPORTS ON
Operating Problems Valuations Traffic Surveys
111 W. Washington Street, Chicago, Ill.

UNA
RAIL BONDS-RAIL JOINTS
DYNAMOTORS
WELDING ROD
UNA Welding & Bonding Co.
Cleveland, Ohio

THE P. EDWARD WISH SERVICE
50 Church St. NEW YORK
Street Railway Inspection DETECTIVES
131 State St. BOSTON

INDUSTRIAL GASES
OXYGEN
ACETYLENE
I.O.C. SYSTEM
HYDROGEN
NITROGEN
Quick shipment and low prices also on cylinders, valves, torches, regulators and supplies.
International Oxygen Co., Main Offices: Newark, N. J.
Branches: New York Pittsburgh Toledo

When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.

Transmission Line and Special Crossing Structures, Catenary Bridges
WRITE FOR OUR NEW DESCRIPTIVE CATALOG
ARCHBOLD-BRADY CO.
Engineers and Contractors SYRACUSE, N. Y.

Type R-11
Double Register

International
Registers

Made in single and double types to meet requirements of service. For hand or foot, mechanical or electric operation. Counters, car fittings, conductors' punches.

The International Register Co.
15 South Throop Street, Chicago, Illinois

THE WORLD'S STANDARD
"IRVINGTON"
Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper
Irr-O-Slot Insulation Flexible Varnished Tubing
Insulating Varnishes and Compounds
Irvington Varnish & Insulator Co.
Irvington, N. J.
Sales Representatives in the Principal Cities

Cold Dinners

for *your* passengers?

Not if you use

AJAX

BABBITT *for* ARMATURES

keeps the rolling stock rolling

The Ajax Metal Company

Established 1880

PHILADELPHIA

NEW YORK CHICAGO BOSTON CLEVELAND

PANTASOTE

Trade Mark

Seat and Curtain Materials

There is no substitute for Pantasote

AGASOTE

Trade Mark

Roofing—Headlining—Wainscoting

The only homogeneous panel board

standard
for electric railway cars
and motor buses

The PANTASOTE COMPANY Inc.
At 46th 250 Park Avenue Street
NEW YORK

Pantasote Products for Both ELECTRIC RAILWAYS AND BUSES

People's Gas Bldg., Chicago, Ill.

Where performance counts

use

Le Carbone Carbon Brushes

They talk for themselves

W. J. Jeandron

Factory Terminal Bldg.,
Fifteenth Street, Hoboken, N. J.
Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street
Canadian Distributors: Lyman Tube & Supply Co., Ltd.
Montreal and Toronto

Kalamazoo Trolley Wheels

The value of Kalamazoo Trolley Wheels and Harps has been demonstrated by large and small electric railway systems for a period of thirty years. Being exclusive manufacturers, with no other lines to maintain, it is through the high quality of our product that we merit the large patronage we now enjoy. With the assurance that you pay no premium for quality we will appreciate your inquiries.

THE STAR BRASS WORKS
KALAMAZOO, MICH., U. S. A.

***The* DIFFERENTIAL CAR**

Standard on 60 Railways for

- Track Maintenance
- Track Construction
- Ash Disposal
- Coal Hauling
- Concrete Materials
- Waste Handling
- Excavated Materials
- Hauling Cross Ties
- Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential 3-way Auto Truck Body
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches..............$4.50 an inch
4 to 7 inches.............. 4.30 an inch
8 to 14 inches.............. 4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

There is a

Searchlight Section

in each McGraw-Hill paper:

[1] American Machinist (American Edition)
[2] Bus Transportation
[3] Chemical and Metallurgical Engineering
[4] Coal Age
[5] Electrical World
[6] Electrical Merchandising
[7] Radio Retailing
[8] Electrical West
[9] Electric Railway Journal
[10] Engineering and Mining Journal
[11] Engineering News-Record
[12] Industrial Engineer
[13] Power
[14] American Machinist (European Edition)

Each of these 14 papers is the leading periodical of the field it serves.

"Searchlight" advertisements will get you in touch with the important men of these important fields.

POSITIONS VACANT

ASSISTANT to engineer, M. of W. graduate. Write experience—salary expected. Box 781, East Liverpool, Ohio.

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(Continued on page 42)

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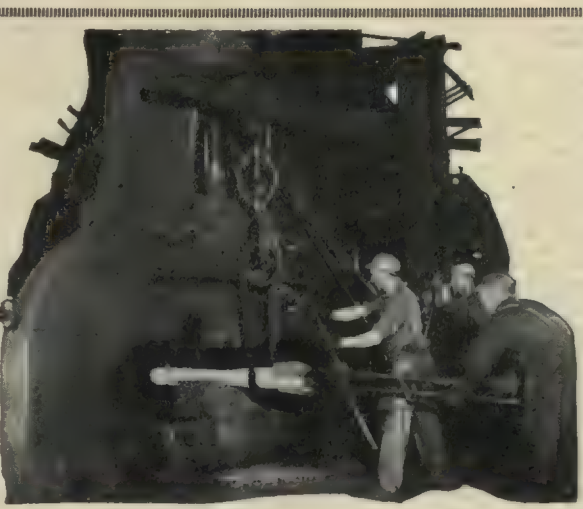

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(Continued on page 45)

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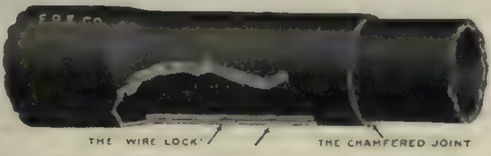

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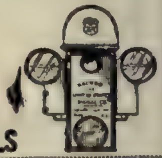

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ALPHABETICAL INDEX TO ADVERTISEMENTS

Page

A

Ajax Metal Co., The............ 38
American Appraisal Co., The... 43
American Brass Co., The....... 44
American Brown Boveri Corp.18-19
American Car Co............46-47
American Creosoting Co....... 28
American Electrical Works..... 43
American Steel Foundries 4
American Telephone & Telegraph Co. 20
American Steel & Wire Co..... 30
Anaconda Copper Mining Co.... 44
Archbold-Brady Co............ 37

B

Babcock & Wilcox Co......... 37
Beeler Organization 36
Bemis Car Truck Co........... 43
Bethlehem Steel Co........... 41
Bibbins, J. Rowland 36
Brill Co., The J. G...........46-47
Buchanan & Layng Corp....... 36

C

Cameron Electrical Mfg. Co.... 44
Carnegie Steel Co.............. 41
Central Alloy Steel Corp....... 29
Chillingworth Mfg. Co......... 43
Cincinnati Car Co...........16-17
Cleveland Fare Box Co........ 43
Cole, A. B..................... 37
Collier, Inc., Barron G......... 32
Columbia Machine Works, The.. 41
Consolidated Car Fender Co.... 44
Consolidated Car Heating Co.... 37

D

Day & Zimmermann, Inc........ 36
De Laval Separator Co., The.... 26
Differential Steel Car Co., The.. 38
Duff Manufacturing Co., The... 43

Page

E

Eastern Mass. St. Ry. Co........39
Electric Equipment Co......... 39
Electric Ry. Equipment Co..... 43
Electric Service Supplies Co..... 9

F

Fitzjohn Mfg. Co.............. 8
Ford, Bacon & Davis.......... 36
"For Sale" Ads............... 39

G

General Electric Co..22, Back Cover
Gold Car Heating & Ltg. Co.... 44
Griffin Wheel Co............. 34

H

Hale-Kilburn Co.............. 45
Haskelite Mfg. Corp........... 37
"Help Wanted" Ads............ 39
Hemphill & Wells 36
Holst, Englehardt W.......... 36
Hubbard & Co. 44

I

Illinois Steel Co.............. 27
India Tire & Rubber Co....... 24
International Creosoting & Construction Co. 31
International Motor Co., Insert 11, 12, 13, 14
International Oxygen Co....... 37
International Register Co...... 37
International Steel Tie Co., The. 7
Irvington Varnish & Insulator Co. 37

J

Jackson, Walter 36
Jeandron, W. J................ 38

Page

K

Kelker, DeLeuw & Co......... 37
Kelly, Cooke & Co............. 36
Kuhlman Car Co............46-47

L

LeCarbone Co................. 38
Linn & Marshall, Inc.......... 36
Lorain Steel Co............... 41

M

Mack Trucks, Inc., Insert 11, 12, 13, 14
McClellan & Junkersfeld 36
More-Jones Brass & Metal Co... 34

N

Nachod and U. S. Signal Co.... 44
National Brake Co., Inc....... 23
National Pneumatic Co........ 15
National Ry. Appliance Co.... 41
Naugle Pole & Tie Co........ 44
Nuttall Co., R. D............. 35

O

Ohio Brass Co................ 5
Okonite-Callender Cable Company, Inc., The.............. 43
Okonite Co., The.............. 43

P

Pantasote Co., Inc............ 38
Perey Mfg. Co., Inc........... 44
Portland Cement Asso. 33
Positions Wanted and Vacant... 39

R

Rail Joint Co., The........... 34
Railway Track-work Co....... 45

Page

Railway Utility Co........... 44
Ramapo Ajax Corp............ 44
Richey, Albert 36
Roebling's Sons Co., John A... 44

S

Salzberg Inc., H. E.......... 39
Safety Car Devices Co........ 10
St. Louis Car Co.......Front Cover
Samson Cordage Works 44
Sanderson & Porter.......... 36
Searchlight Section 39
Shuler Axle Co.............. 35
Smith Heater Co., Peter...... 44
Standard Steel Works Co...... 25
Star Brass Works............ 38
Stevens & Wood, Inc......... 36
Stone & Webster 36
Stucki Co., A................ 44

T

Transit Equipment Co......... 39

U

Una Welding & Bonding Co.... 37
United States Rubber Co...... 21
Universal Lubricating Co...... 43

V

Van Loan Corp., Irving S...... 39

W

"Want" Ads 39
Wason Mfg. Co.............46-47
Westinghouse Traction Brake Co. 6
Wharton, Jr. & Co., Inc., Wm... 41
"What and Where to Buy", 40-42-45
White Eng. Corp., The J. G.... 36
Wish Service, The P. Edw..... 37
Wood Co., Chas. N............ 44

WHAT AND WHERE TO BUY—Continued from page 42

Tree Wire
Okonite Co.
Okonite-Callender Cable Co.

Trolley Bases
General Electric Co.
More-Jones Brass & Metal Co.
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for light-weight modern cars is designed for inside-hung motors and equipped with the various patented devices, as well as solid-forged sideframes, for which Brill trucks are noted. As a result this type of truck is capable of meeting every requirement of modern city service as far as riding comfort and minimum maintenance is concerned.

The Brill No. 201-A Type Seat,

upholstered in genuine leather, proves immensely popular with the riding public. Its cushion is 4¾ in. deep at front. The well-known Brill "Winner" reversing mechanism assures positive action with a simplicity in design and such few parts as to eliminate any tendency to get out of order. Inviting comfort and minimum maintenance, therefore, are its two outstanding characteristics.

Brill "Exhaust" Ventilator

Symmetrical and attractive in appearance, the Brill Exhaust Ventilator exhausts impure air from the carbody without subjecting the passengers to unhealthy draughts.

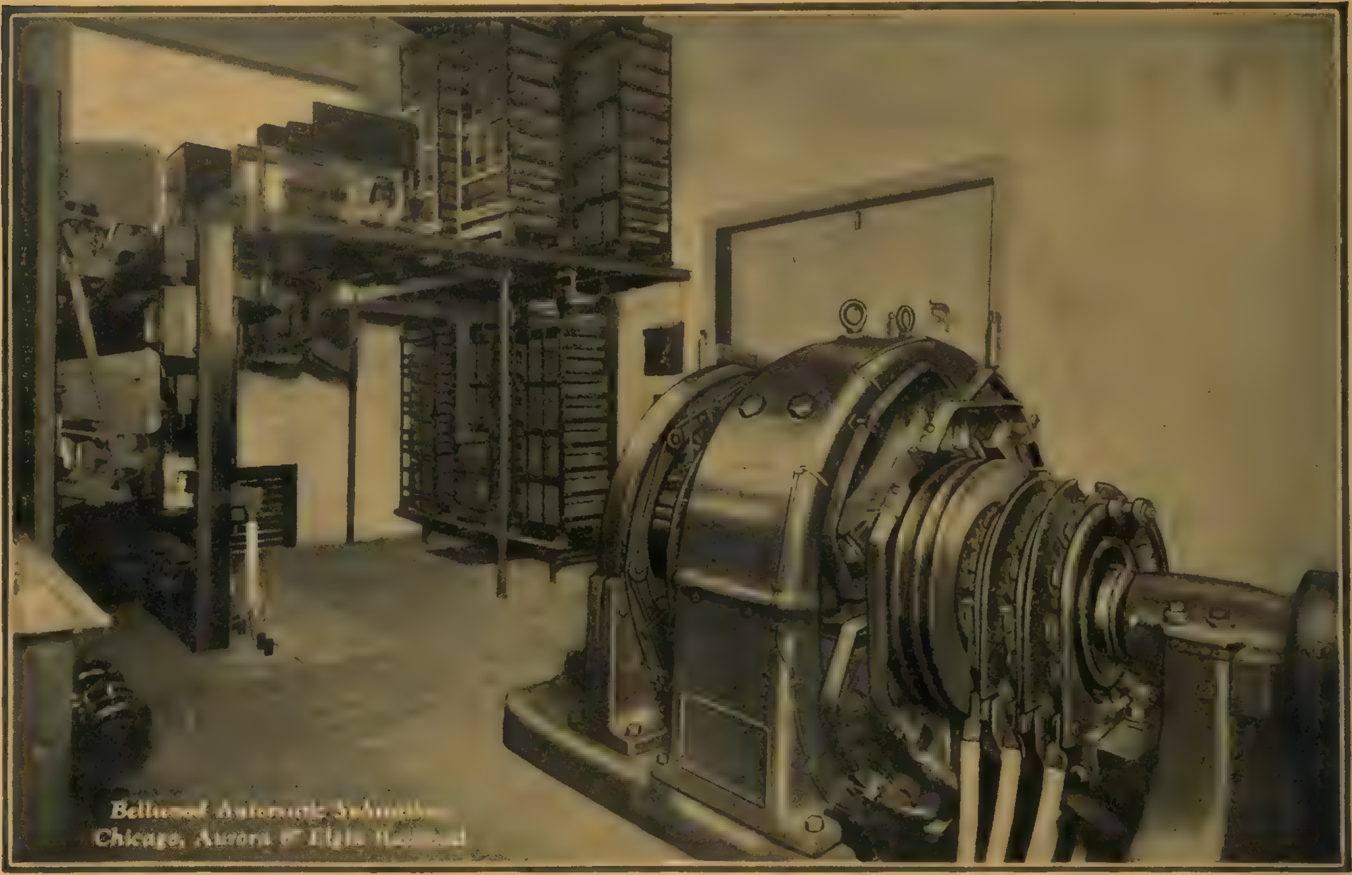
Brill Renitent Post Casings

hold the window sash under compression, keeping out rain, dust and air, eliminate any tendency toward sash rattle, and permit the installation of new sash without the aid of tools when window is broken, thus making it unnecessary to take the car out of service.

Brill Full-vision All-Metal Sash

A bright and cheerful interior also adds to a car's attractiveness. The use of Brill all-metal sash in place of wooden sash reduces the amount of "dead light" construction. Note comparison between metal and wood in the illustration.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. — G. C. KUHLMAN CAR CO. — WASON MANF'G CO.
ST. LOUIS MO. CLEVELAND, OHIO. SPRINGFIELD, MASS.


Bellwood Automatic Substation
Chicago, Aurora & Elgin Railroad

Smoothing out the starting loads

Some idea of the severe overloads encountered by substations of the Chicago, Aurora & Elgin Railroad is obtained from the fact that frequently two 6-car trains are started at one time, each normally requiring 4000 amperes.

By the use of automatic substations these trains can be accelerated properly and kept on time. Resistance is automatically connected to limit the converter current to a safe value. Thereby service is uninterrupted, even though the power required is greatly in excess of the converter capacity.

This load-limiting feature was one of the considerations upon which this company based its decision to use G-E Automatic Substations.

G-E Automatics, early adopted by the Chicago, Aurora & Elgin, have greatly facilitated operation of this road under heavy overloads. Their operating records show that 99.18% of several thousand starts are perfect; attention is one-fourteenth of that for manual stations.

3-22

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN ALL PRINCIPAL CITIES